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EPA Superfund
Record of Decision:

OHIO RIVER PARK
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NEVILLE ISLAND, PA
09/27/1996

SUPERFUND PROGRAM

RECORD OF DECISION

Ohio River Park Site

Operable Unit One
Neville Island
Allegheny County, Pennsylvania

September 1996

RECORD OF DECISION

OHIO RIVER PARK SUPERFUND SITE

DECLARATION

SITE NAME AND LOCATION

Ohio River Park Superfund Site
Neville Township
Allegheny County, Pennsylvania

STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) presents the selected remedial action plan for the Ohio River Park Superfund Site (the "Site") in Allegheny County, Pennsylvania which was chosen in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 ("CERCLA"), as amended by the Superfund Amendments and Reauthorization act of 1986, 42 U.S.C. § 9601 ("SARA"), and to the extent practicable,the National Oil and Hazardous Substances Pollution Contingency Plan ("NCP"), 40 C.F.R. Part 300. This decision is based upon and documented in the contents of the Administrative Record. The attached index identifies the items which comprise the Administrative Record.

The Commonwealth of Pennsylvania concurs with the selected remedy.

ASSESSMENT OF THE SITE

Pursuant to duly delegated authority, I hereby determine, pursuant to Section 106 of CERCLA, 42 U.S.C. § 9606, that actual or threatened releases of hazardous substances from this Site, as specified in Section VII, Summary of Site Risks, in the ROD, if not addressed by implementing the response action selected, may present an imminent and substantial endangerment to the public health, welfare, or the environment.

DESCRIPTION OF THE SELECTED REMEDY

The remedial action plan in this document is presented as the permanent remedy for controlling the buried waste and contaminated soil at the Site. This remedy is comprised of the following components:

! Capping of concentrated waste areas with a multilayer cap designed in accordance with

Pennsylvania Residual Waste Management Regulations.

- Capping areas not covered with the multilayer cap and not covered with adequate vegetative cover with an erosion cap.

- Installing a surface water control system to control transport of surface soil both on- and off-site.

- Abandoning the existing on-site oil well in accordance with Pennsylvania Oil and Gas Well Regulations.

- Installing a passive gas collection system to ensure the ntegrity of the cap.

- Deed preventing residential use of the Site.

- Long-term monitoring of groundwater, surface water, and sediment.

STATUTORY DETERMINATIONS

Pursuant to duly delegated authority, I hereby determine that the selected remedy is protective of human health and the environment, complies with Federal and State requirements that legally are applicable or relevant and appropriate to the remedial action, and is cost-effective. The selected remedy utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable, and satisfies the statutory preference for remedial actions in which treatment that reduces toxicity mobility, or volume is a principal element.

Because this remedy will result in hazardous substances remaining on size above health-based levels, a review will be conducted within five (5) years after the commencement of the remedial action to ensure that human health and the environment continue to be adequately protected by the remedy.

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OHIO RIVER PARK SITE

PART II - DECISION SUMMARY

I. SITE NAME, LOCATION,AND DESCRIPTION

The Site consists of approximately 32 acres on the western end of Neville Island, approximately 10 miles downstream of the City of Pittsburgh (Figure 1). The Ohio River borders the Site to the north and the Back Channel of the Ohio River borders it to the south. The Site is accessible from the mainland via the new Coraopolis Bridge, linking the Town of Coraopolis with Neville Island. The Ohio River Park Site has been identified in some documents, mostly preceding EPA involvement, as Neville Island. This Record of Decision ("ROD") will refer to the Site as the "Ohio River Park Site", or "the Site".

The Ohio Raver Park Site is defined as, all areas found presently, or in the future, to be impacted by contamination that resulted from hazardous waste disposal operations previously conducted at this location. ROD addresses burred waste and soil contamination at the Site, which includes: 1) industrial (primarily tar waste) disposed in fifty-four disposal trenches; 2) industrial, construction, and municipal waste disposed in piles; and 3) contaminated soil. This Record of Decision does not address groundwater cleanup at the Site. Although the Proposed Plan identified potential groundwater cleanup options, EPA agreed to provide the Potentially Responsible Parties ("PRPs") with the opportunity to provide additional hydrologic data prior to selecting the groundwater cleanup remedy for the Site. The groundwater cleanup remedy will be documented in a subsequent ROD.

Land use on Neville Island is generally industrial/commercial, although there are some residential areas. The middle section of the island east of the Site and west of Highway I-79 is mostly residential and commercial while the eastern end of the island is heavily industrialized. Most of Neville Island's 930 residents live in the area between the Coraopolis Bridge and Highway I-79. The nearest residence is located approximately 450 feet from the Site. According to the 1990 census, the population within an approximately four-mile radius of the Site is 18,058 people. The eastern end of the island, approximately two miles east of the Site, is occupied by petrochemical facilities, coal coking facilities and abandoned steel facilities.

The Site consists primarily of open fields surrounded by trees and underbrush which form a perimeter adjacent to the river. The major structures on the Site include a maintenance building, asphalt-covered parking lots, roadways and walkways, concrete foundations, a pipeline, underground utilities, and an abandoned oil well derrick. The Site is located almost completely within the 100-year floodplain but above the ordinary high water elevation.

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SITE HISTORY AND ENFORCEMENT ACTIVITIES

Prior to the 1940's, the predominant land use at the Site was agricultural. Beginning in the mid-1930's until the mid-1950's, a portion of the Site was used for municipal landfill operations including the disposal of domestic trash and construction debris. Industrial waste disposal activities were conducted at the Site from 1952 through the 1960's.

Available information indicates that Pittsburgh Coke and Chemical Company ("PC&C") disposed of much of the industrial waste at the Site. PC&C began production of coke and pig iron on the eastern end of the island in 1929, operated a cement products plant during the 1930's, and produced coal coking by-products during the 1940's. Between 1949 and 1955, PC&C's Agriculture Chemicals Division manufactured pesticides. Two methods of waste disposal were used by PC&C at the Site: wet wastes were placed into trenches and dry wastes were piled on the surface. Fifty-four trenches have been identified as being used for disposal of tar acid, tar decanter, and occasionally agricultural chemical wastes. Figures 2 and 3 show the approximate disposal locations of various wastes at the Site. PC&C operations ceased in 1965-66. PC&C merged into Wilmington Securities, Inc., the parent corporation of the Neville Land Company.

In 1977, Neville Land Company donated the Site area to Allegheny County. Allegheny County began construction of a park on the Site in 1977 and completed the construction in 1979. The park was never opened to the public, however, and was subsequently dismantled. During the course the work, approximately 13,000 cubic yards of various wastes were discovered at the Site. While most of these materials were excavated and removed from the Site, some materials were reburied. After this discovery, Allegheny County transferred the title to the land back to Neville Land Company. A small portion of the property, including the Buckeye Pipeline gas pipe easement, was not transferred to Neville Land Company.

Based on information and data collected from 1977 through 1989 by Allegheny County, EPA, the Neville Land Company, and the Pennsylvania Department of Environmental Resources ("PADER"), now the Pennsylvania Department of Environmental Protection ("PADEP")), EPA proposed to include the Site on the National Priorities List of Superfund sites on October 16. 1989. The analytical data collected were used to evaluate the relative hazards posed by the Site using EPA's Hazard Ranking System ("HRS"). EPA uses the HRS to calculate a score for hazardous waste sites based upon the presence of potential and observed hazards. If the final HRS score exceeds 28.5, the Site may be placed on the National Priorities List, making it eligible to receive Superfund monies for remedial cleanup. This Site scored 42.24, and was placed on the list on August 30, 1990.

In October 1991, EPA and Neville Land Company, the owner of the Site, entered into an Administrative Order on Consent in which the Neville Land Company agreed to conduct a Remedial Investigation/Feasibility Study ("RI/FS") of the Site with EPA and State oversight. The Remedial investigation ("RI") Report for the Site, based on the 1992 and 1993 field sampling, was approved by EPA in June 1994. The Ecological Risk Assessment was completed in November 1994 and the Baseline Human Health Risk Assessment was completed in January

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1995. Based on these documents, Neville Land Company submitted a Feasibility Study ("FS") in April 1995 describing the remedial action objectives and comparing cleanup alternatives for the Site. In April 1996, EPA presented a Proposed Plan, which utilized the Feasibility Study, and evaluated four alternatives to remediate contamination at the Site.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The documents which EPA used to develop, evaluate, and select a remedial alternative for the Site have been maintained at the Coraopolis Memorial Library, State and School Streets, Coraopolis, PA and at the EPA Region 3, Philadelphia Office.

The RI/FS and Proposed Plan for the Ohio River Park Site were released to the public on April 2, 1996. The notice of availability for these documents was published in the Tribune Review on April 2, 1996, and in the Pittsburgh Post-Gazette on April 4, 1996. A 30-day public comment period began on April 2, 1996 and was initially scheduled to conclude on May 1, 1996. By request, the public comment period was extended until June 12, 1996.

A briefing for the Board of County Supervisors and a public meeting were held during the public comment period on April 15, 1996. At the meeting, representatives from EPA answered questions about the Sit and the remedial alternatives under consideration. Approximately 100 people attended the meeting, including residents from the impacted area, local government officials, and news media representatives. A summary of comments received during the public comment period and EPA's responses are contained in Part III of this document.

The initial Proposed Plan contemplated remediation of all the affected media: soils, waste material, groundwater, surface water, and sediments. In response to concerns raised before and during the comment period, EPA decided to issue a ROD to address the soils and waste material at this time, and to make the decision pertaining to other media after additional studies have been completed.

IV. SCOPE AND ROLE OF THE RESPONSE ACTION

As with many Superfund sites, the problems at the Ohio River Park Site are complex. Prior to this ROD, the Site was divided into two areas or Operable Units ("OUs"). Operable Unit One ("OU-1") included the entire Site except for a one-acre portion on the southeast corner consisting of an approach to the Coraopolis Bridge and a meadow along the Back Channel of the river. This one-acre area has been designated Operable Unit Two ("OU-2"). EPA issued a ROD for OU-2 on March 31, 1993 that states no action is required in this area.

While the Proposed Plan issued for OU-1 addressed contamination found in soil, groundwater, surface waters and sediments at the Site, EPA has determined that OU-1 and, therefore, this ROD will be limited to contamination in the buried waste and soil at the Site. The contamination found in the groundwater, surface water, and sediments will be addressed separately as Operable Unit Three ("OU-3"). A subsequent ROD will identify the appropriate cleanup requirements for OU-3 after completion of additional studies.

V. SUMMARY OF SITE CHARACTERISTICS

A. Surface Features

The Site is mostly open area with a few improvements. The Site is protected by a metal fence with a gate at the entrance, an abandoned asphalt road located at the curve of Grand Avenue (Figure 4). The road leads to an approximately two-acre asphalt parking lot surrounded by meadows at the entrance to a park. The asphalt surface has not been maintained and is cracked in many places with several visible depressions and holes. The road goes further to a small parking lot in front of a former park administration building. Between this building and the Ohio River, the terrain is covered by trees, which form the border of the Site along the river. The central portion of the Site includes open meadows sparsely covered with brush and is encircled by an abandoned asphalt biking path. Along the river banks, and at the western end of the island, trees and brush become denser, and woods gradually replace the meadow. An abandoned oil well derrick is located along the Ohio River bank in the north-central part of the Site. The western part of the Site, including the steep terraces on the river banks, is densely covered with trees.

The configuration of the Site was changed in 1977-79 when, during construction of the recreational park, approximately 13,000 cubic yards of materials were excavated and the area was leveled and covered with soil. Aerial photography and Remedial Investigation sampling revealed location of dumping areas (see Figure 2) and the types of wastes disposed (see Figure 3). Two methods of waste disposal were utilized at the Site. Wet wastes were placed into 54 trenches and dry wastes were piled on the surface and/or incinerated at the Site. Most of the manufacturing and municipal wastes were disposed at the south-central portion of the Site beneath the currently existing parking lot, in the meadows, and along the Back Channel river banks. Steep river ledges at the western part of the Site were created by piles of foundry sand and demolition debris.

B. Geology

The Ohio River Park Site lies within the Allegheny Plateau section of the Applachian Plateau Physiographic Province. The Allegheny Plateau is characterized by gently folded, parallel, northeast-southwest trending folds. At the Site, the bedrock is identified as the Glenshaw and Casselman Formations of the Pennsylvanian Age Connemaugh Group. These formations are primarily composed of interbedded shale, siltstone and sandstone with thin beds of limestone and coal. The Glenshaw Formation, which is the lower member of the Connemaugh Group and the Casselman Formation, which is the upper member of the Connemaugh Group is separated by the Ames Limestone in Western Pennsylvania.

Like most stream valleys in Western Pennsylvania, the Ohio River consists of unconsolidated sediments overlying bedrock. Neville Island is a portion of a dissected river terrace that was deposited by the ancestral Ohio River. The unconsolidated sediments at the Site are

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approximately 60 feet thick and in the Ohio River Channel 20 feet thick. At the site, the upper portion of the unconsolidated sediments consist of approximately 25 feet of fill, and Quarternary fluvial deposits of clay, silt and sand. The lower 35 feet consists of glaciofluvial deposits of sand and gravel with minor amounts of silt and clay that were deposited from glacial meltwaters during the Pleistocene interglacial stages. The top of bedrock at the Site appears to gently slope toward the south-southwest.

Fill is found throughout the Site, with the exception of the eastern boundary where it is absent. Former trenches in the south-central portion of the Site extend to a maximum depth of 12 feet. Foundry sand disposed in the western part of the Site is up to 27 feet deep.

C. Hydrology

The Site is bounded by the Back Channel of the Ohio River to the south and by the Main Channel of the Ohio River to the north. The flow rate in the river has varied from 108,000 cubic feet per minute (measured at Sewickley in 1957) to 4,440,000 cubic feet per minute (measured at Sewickley in 1935). Since approximately 90 percent of the flow occurs in the Main Channel, the minimum and maximum flow in the Back Channel are approximately 10,800 and 44,400 cubic feet per minute, respectively. The Ohio River is navigable and chemicals, coal, and coke are routinely transported on the river by barges.

The Site sediments constitute an unconfined surficial aquifer that extends beneath the Ohio River and is interconnected to the river. Bedrock, consisting of shale, siltstone and fine-grained, micaceous sandstone, underlies these sediments. The groundwater in the sand/gravel aquifer beneath the Site discharges primarily to the Main and Back Channels of the Ohio River. However, this aquifer interconnects with groundwater beneath the river and on the shores. Groundwater is used as a source of drinking water by several municipalities which flank the Ohio River. The nearest one is the municipality of Coraopolis. The Coraopolis well field is located approximately 750 feet southwest from the western boundary of the Site, along the Back Channel. The well field consists of seven wells that produce an average of 127 cubic feet per minute.

D. Climate

The climate of Allegheny County is classified as humid continental. The annual average precipitation is 37 inches, and it is evenly distributed throughout the year. The mean annual temperature is approximately 50 degrees Fahrenheit.

VI. NATURE AND EXTENT OF CONTAMINATION

The primary objective of the Remedial Investigation was to characterize the nature and extent of hazardous substances present at the Ohio River Park Site. As a part of this effort, the RI identified and evaluated Site-related contaminants, their potential migration routes, and exposure pathways for human and ecological receptors.

A. Air Quality

On-site ambient air monitoring was conducted between November 9 and November 18, 1992. During the air quality investigation, a meteorological station was established at the Site. The station collected 349 consecutive hours of meteorological data measuring speed and direction of winds. Data on temperature and precipitation were obtained from the National Weather Service station, which located at the Greater Pittsburgh International Airport, approximately four miles from the Site.

Samples were collected during four days from four sampling stations, one prevailing upwind and three downwind. The laboratory analysis of collected samples revealed trace concentrations of naphthalene, 2-methylnaphthalene, and selected volatiles in air samples. However, because these compounds were found in both upwind and downwind samples, and are generally present in the region, they do not appear to originate at the Site.

B. Surface Soil Contamination

Twenty-nine surface soft samples were taken from 0 to 1.5 feet below the surface and 11 were taken from 0 to 2 feet below. Figure 5 presents surface soil sampling locations.

Semi-Volatile Organic Compounds

Semi-volatile organic compounds ("SVOCs") were detected with the highest levels in the south central portion of the Site. Numerical data on their detection frequency and concentration are provided in the Table 1.

The SVOCs which were most prevalent and represent the highest concentrations were Polyaromatic Hydrocarbons ("PAHs"), the only group of contaminants detected across the entire Site PAHs were found in 37 of 40 soil sample locations. The PAHs found at the highest concentrations were fluoranthene (97,000 parts per billion ("ppb") at location NSSF-3), naphthalene (34,000 ppb at location NSSG-4), phenanthrene (100,000 ppb at location NSSF-3), pyrene (63,000 ppb at location NSSF-3), benzo(a)anthracene (35,000 ppb at location NSSF-3), and benzo(a)fluoranthene (42,000 ppb at location NSSF-3).

The highest total PAH concentration was 449,000 ppb and was detected at location NSSE-3. Semi-volatile organic compounds other than PAHs were found in some parts of the Site at significantly lower concentrations: Phenolic compounds were detected in the trench area at a maximum concentration of 2,140 ppb at location NBS-39-1; and phthalate compounds were found on the eastern part of the Site at a maximum concentration of 71,000 ppb at location ERTS-48-1. PAH compounds are, therefore, the primary contaminants in surface soils.
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Table 1 - Semi-Volatile Organic Compounds in Surface Soil

COMPOUND	DETECTION FREQUENCY AT 40 LOCATIONS	MINIMUM DETECTED CONCENTRATION (ppb)	MAXIMUM DETECTED CONCENTRATION (ppb)
Acenaphthene	12	160	4,900J
Acenaphthylene	1	-	520J
Anthracene	27	120J	18,000J
Fluorene	16	120J	4,500J
Fluoranthene	36	70J	97,000
Naphthalene	30	53J	340,000J
Benzo(g,h,i)perylene	27	76J	20,000
Phenanthrene	34	60J	100,000
Pyrene	34	140J	63,000
Benzo(a)anthracene	33	140J	35,000
Benzo(b)fluoranthene	34	100J	42,000
Benzo(k)fluoranthene	28	210J	20,000
Benzo(a)pyrene	30	66J	25,000
Chrysene	33	75J	34,000
Dibenz(a,h)anthracene	10	210J	3,600J
Indeno(1,2,3,cd)pyrene	28	60J	19,000
2,4,6 -Trichlorophenol	6	260J	970
2,4 -Dichlorophenol	3	120J	2,000J
Phenol	1	-	1,200J
2-Methylnaphthalene	19	120J	13,000J
Dibenzofuran	15	150J	11,000J
Carbazole	12	120J	3,100J
Bis(2-ethylhexyl)phthalate	17	180	71,000
Di-n-butylphthalate	4	63J	180J
Diethylphthalate	2	150J	1100
Di-n-octylphthalate	1	-	57J

Data qualifier: "J" - The reported concentration is an estimated value.

Table 2 -VOCs in Surface Soil

COMPOUND	DETECTION FREQUENCY AT 40 LOCATIONS	MINIMUM DETECTED CONCENTRATION (ppb)	MAXIMUM DETECTED CONCENTRATION (ppb)
Toluene	28	3J	29J
Trichloroethene	27	3J	29J
Chloroform	16	3J	17J
Tetrachloroethane	15	3J	8J
Ethylbenzene	14	2J	14J
Benzene	8	3J	22J
1,1,1-Trichloroethane	6	3J	8J
1,2-Dichloroethene	4	4J	9J
2-Butanone	1	-	4J
Xylenes	1	-	3J
4-Methyl-2-pentanone	1	-	10J
Carbon disulfide	1	-	4J
Chlorobenzene	1	-	4J
1,1-Dichloroethene	1	-	5J

Data qualifier: "J" - The reported concentration is an estimated value.

Volatile Organic Compounds

Volatile Organic compounds ("VOCs") were detected in surface soil at concentrations below 30 ppb across the Site. The VOC data are summarized in Table 2. The most common VOCs were toluene and trichloroethene.

Pesticides

Pesticides were detected at the highest concentrations in the central portion of the Site. The data are summarized in Table 3. No organophosphate pesticides were detected during the Remedial Investigation. The following organochlorine pesticides were detected: gamma-chlordane at 900 ppb at location NSSE-3; alpha-chlordane at 450 ppb at location NSSE-3; aldrin at 260 ppb at location NSSG-4; heptachlor at 240 ppb at location NSSE-3; DDT at 360 ppb at location SSSN-3; and hexachlorides (ß-BHC and -BHC) at 1,800 ppb at location NSSE-3.

Other Contaminants

Herbicides were detected in 26 of 40 surface soil samples. The herbicide 2,4-D was detected in 17 locations, ranging from 22 ppb to 10,000 ppb at location NSSD-2. The herbicide 2,4,5-TP was detected at 10 surface locations at concentrations from 3 ppb to 3,900 ppb at location NSSH-2. Concentrations of 2,4,5,-T ranged from 15 ppb to 2,900 ppb at location NSSD-2.

Table 3 - Pesticides in Surface Soils

PESTICIDE	DETECTED FREQUENCY AT 40 LOCATIONS	MINIMUM DETECTED CONCENTRATION (ppb)	MAXIMUM DETECTED CONCENTRATION (ppb)
alpha-BHC	18	0.45JP	830X
beta-BHC	9	2.1JP	1800X
delta-BHC	12	0.6JP	410X
gamma-BHC	16	0.87J	2100X
Heptachlor	10	3.0	240
Aldrin	19	0.71JP	260
Heptachlor epoxide	12	0.58JP	47
Endosulfan I	1	-	17JP
Dieldrin	12	0.72JP	140P
4,4'-DDE	10	0.33J	25JP
Endrin	5	0.75JP	12JP
Endosulfan II	9	0.4JP	54P
4,4'-DDD	4	0.55JP	210P
Endosulfan Sulfate	4	2.4JP	48JP
4,4'-DDT	21	0.31JP	360C
Methoxychlor	2	0.98JP	590PX
Endrin Ketone	6	0.27JP	74P
Endrin Aldehyde	1	-	6.2J
alpha-Chlordane	28	0.27JP	450C
gamma-Chlordane	25	0.36JP	900C
alpha-BHC	18	0.45JP	830X

Data qualifiers: "P" - There was greater than 25% difference between the columns.
"X" - The compound could not be confirmed using gas chromatography/mass spectrometer ("GC/MS").
"J" - The reported result is an estimated value.
"C" - The compound was confirmed using GC/MS.

Dioxin (2,3,7,8-TCCD) was detected in seven of 11 locations. The following samples showed concentrations above the EPA Region III potential action level based on human health risks of 0.019 ppb for commercial/industrial soils: 0.42 ppb at location NSSI-3; 0.069 at location NSSE-3;0.056 at location NSSI-1; and 0.041 at location NSSG-3.

Polychlorinated biphenyls ("PCBs") were detected at 15 out of 40 surface soil samples. Three samples collected at the north-western part of the Site had concentrations above the EPA Region III action level based on human health risk of 370 ppb for the commercial/industrial soil: at location NSSE-1, the concentration was 1,260 ppb; at location NSSA-2, the concentration was 490 ppb at location NSSC-1, the concentration was 410 ppb.

Metals and cyanide concentrations did now show a specific spacial pattern. The concentrations were similar to the background concentrations and only slightly above mean surface soil concentrations in the United States. A few samples showed elevated concentrations including arsenic (43.3 parts per million ("ppm") at location NSSC-1), and beryllium (5.1 ppm at location NSSW-1).

C. Subsurface Soil Contamination

Nine subsurface soil samples were collected during the Remedial Investigation at the Site at locations shown in Figure 6. These samples were collected from one to two foot intervals ranging in depth from 4 to 32 feet below ground surface.

VOCs were detected in five out of nine subsurface soil samples at the Site. Table 4 summarizes the sampling results. Benzene was detected at 11,000 ppb at location NB-42 at a depth of 30-32 feet.

Table 4 - VOCs in Subsurface Soils

COMPOUND	DETECTION FREQUENCY AT 9 LOCATIONS	MINIMUM DETECTED CONCENTRATION (ppb)	MAXIMUM DETECTED CONCENTRATION (ppb)
Toluene	4	6J	2,700
Ethylbenzene	2	4J	86J
Benzene	3	17	11,000J
Xylenes	3	11J	580
2-Butanone (MEK)	2	970J	1,000J
Chlorobenzene	2	3J	150
1,2-Dichloroethene	1	-	3J

Data qualifier: "J" - The reported concentration is an estimated value.

SVOCs, including PAHs, phenolics, and phthalates, were detected in six out of nine samples located along the Back Channel and at the south central portion of the Site. Table 5 summarizes detection frequency and concentration ranges of particular SVOCs. Figure 7 shows the total concentration of particular groups of SVOC contaminants at each location. The highest concentration of total PAHs was 38 ppm, at location NB-46 near the waste trench areas. Background levels of PAHs, collected east of the Coraopolis Bridge, were approximately ten times lower. Phenolic compounds were detected at three of the nine samples. The highest concentration of phenolics was 28,000 ppb which was detected along the Back Channel at location NB-42 at a depth of 30-32 feet. Phthalate compounds were detected at five sample locations, ranging from 67 ppb at the background sample to 15,500 ppb at the trench area at location NB-46 at a depth of 14-16 feet.

Pesticides were generally detected at concentrations of less than 1 ppm in the subsurface soils. Three pesticides were detected above 1 ppm at two locations: DDT was detected at 1.5 ppm at location NB-46 at a depth of 14-16 feet, and alpha-BHC and beta-BHC were detected at 7.9 ppm and 5.9 ppm, respectively, at location NB-44 at a depth of 8-10 feet.

Herbicides were detected in subsurface soil in lower concentrations than in surface soils. Concentrations of the herbicide 2,4-D ranged from 120 to 2,100 ppb; concentrations of 2,4,5-T ranged from 31 to 370 ppb.

Metal and cyanide were found in similar concentrations to those found in surface soils. The concentration of lead was similar to the background sample. The highest concentration of mercury was 0.66 ppm at location NB-48. Cyanide was detected in three out of nine Site samples in concentrations ranging from 4.4 ppm to 5.8 ppm (location NB-48 at 10 to 12 feet). Neither mercury or cyanide were detected in the Site-specific background sample.

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D. Buried Waste

Historical waste sample analysis identified several categories of waste (see Figure 2) at the Site:

- Desulfurization Waste: Approximately 3,700 cubic yards of desulfurization waste is present at the Site. This waste was generated by washing light oils with sulfuric acid or by removing sulfur from coke oven gas. (These wastes consist of iron oxide, wood chips, and granular media.)

- Pesticides and Herbicides: Small concentrations of pesticides and herbicides were detected at various locations at the Site. (Three bags of 2,4-D were removed in 1982.)

- Coke Process Waste: The Site contains approximately 10,000 to 20,000 cubic yards of coal coking process waste containing tar, particles of coal, ash, bitumen, pitch and slag. These wastes were disposed in trenches five to ten feet deep primarily on the south-central portion of the Site. One tar-like seep, approximately 25 feet long, was observed 150 feet south of boring NB-46.

Table 5 - SVOCs in Subsurface Soils

COMPOUND	DETECTION FREQUENCY AT 9 LOCATIONS	MINIMUM DETECTED CONCENTRATION (ppb)	MAXIMUM DETECTED CONCENTRATION (ppb)
2,4-Dichlorophenol	1	-	12,000
Phenol	1	-	5,200
2-Methylphenol	1	-	430J
4-Methylphenol	1	-	2,100J
2,4,6,-Trichlorophenol	3	260J	8,100
Diethylphthalate	2	67J	120J
Di-n-butylphthalate	4	51J	1,500J
Bis(2-ethylhexyl)phthalate	2	840J	14,000
Carbazole	2	390J	740J
Diebenzofuran	3	350J	1,700J
2-Methylnaphthalene	3	270J	1,800J
Naphthalene	4	1,100J	5,000
Fluorene	2	400J	1,500J
Phenanthrene	3	3,100J	5,600
Acenaphthene	2	320J	2,700J
Anthracene	3	620J	1,100J
Fluoranthene	3	1,900J	8,500
Pyrene	3	1,400J	7,300
Benzo(g,h,i)perylene	2	2,500J	2,600
Benzo(a)anthracene	2	5,000	5,900
Chrysene	3	530J	3,500
Benzo(b)fluoranthene	2	6,000	6,200
Benzo(k)fluoranthene	2	940J	1,300J
Benzo(a)pyrene	2	2,000J	2,300
Indeno(1,2,3-cd)pyrene	2	1,300J	2,800
Dibenz(a,h)anthracene	1	-	800J

Data qualifier: "J"- The reported concentration is an estimated value.

- Foundry Sand: Approximately 87,000 cubic yards of foundry sand used to mold iron to a desired shape is present at the western end of the Site.

- Dry Ash: The incombustible residue remaining after combustion of coal in the coal coking process is known as dry ash and was found at the Site.

- Slag: Impurities that rise to the top of molten steel during the coke production process are known as slag. Slag, which is primarily composed of calcium and silica with smaller quantities of metals, was found at the Site.

- Miscellaneous wastes, including cement operation wastes, municipal wastes, demolition rubble and others, were also found at the Site.

Three waste material samples were collected from the former disposal trenches during the Remedial Investigation at locations shown in Figure 8. The waste material included slag, pieces of tar, ash, stained soil, calcium carbonate waste, metal pipes, wire, bricks, and coal coking waste. Laboratory results of waste material in the trenches are presented in Table 6. These results showed the following:

- VOCs were found in high concentrations: benzene (170 ppm, 2300 ppm, 8900 ppm), toluene (2400 ppm), xylenes (220 ppm);

<IMG SRC 0396227G>
<IMG SRC 0396227H>

- SVOCs presented similar concentrations to the maximum concentrations found in the subsurface soils;

- Among eleven detected pesticides, most presented similar concentrations to the maximum concentrations found in subsurface soil. The only herbicide found was 2,4-D at a concentration approximately ten times higher than in subsurface soil.

VII. SUMMARY OF SITE RISKS

Following the Remedial Investigation, analyses were conducted to estimate the human health and environmental hazards that could result if contamination at the Site is not cleaned up. These analyses are commonly referred to as risk assessments and identify existing and future risks that could occur if conditions at the Site do not change. The Baseline Human Health Risk Assessment ("BLRA") evaluated human health risks and the Ecological Risk Assessment ("ERA") evaluated environmental impacts from the Site.

A. Human Health Risks

The BLRA assesses the toxicity, or degree of hazard, posed by contaminants related to the Site, and involves describing the routes by which humans and the environment could come into

Table 6 -Analytical Results for Waste Material Samples

Sample ID:	NWP-1	NWP-2	NWP-3
Collection Date:	3/5/93	3/5/93	3/5/93
Sample Depth (ft.):	4-6 feet	2-4 feet	4-6 feet
Units:	ppm	ppm	ppm
VOLATILES			
Benzene	170	2,300	8,900
Toluene	19J (a)	ND	2,400
Ethylbenzene	ND(b)	38J	ND
Xylenes (total)	4.9J	ND	220J
SEMIVOLATILES			
Phenol	0.62J	12J	19J
2,4-Dicholorphenol	2.7J	ND	ND
Bis(2-ethylhexyl)phthalate	ND	4.6J	ND
Dibenzofuran	ND	4.5J	ND
2-Methylnaphthalene	ND	ND	12J
Naphthalene	ND	39J	320
Fluorene	2.2J	3.6J	ND
Acenaphthene	ND	2.7J	ND
Phenanthrene		16J	68J
Anthracene		16J	ND
Pyrene	ND	7.6J	37J
Fluoranthene	ND	11J	58J
Benzo(a)pyrene	ND	2.1J	ND
Chrysene	ND	5.2J	23J
Benzo(b)fluoranthene	ND	4.3J	19J
Benzo(a)anthracene	ND	3.9J	21J
PESTICIDES			
alpha-BHC	ND	0.026P	ND
delta-BHC	ND	0.065P	0.19
Aldrin	ND	0.0066JP	ND
Methoxychlor	ND	0.054JP	ND
Dieldrin	ND	ND	0.045P
Heptachlor Epoxide	ND	ND	0.032P
4,4'-DDE	ND	ND	0.036P
Endosulfan II	ND	ND	0.015JP
4,4'-DDD	ND	ND	0.045J
Endrin Ketone	ND	ND	0.024JP
gamma-Chlordane	ND	ND	0.0049JP
HERBICIDES			
2,4-D	13J	17J	ND

Data Qualifiers:
"J" - Estimated value, the compound was detected at less than the minimum detection limit.

"ND" - The compound was not detected.
"P" - There was greater than 25% difference between gas chromatograph columns.

contact with these substances. Separate calculations are made for those substances that can cause cancer (carcinogenic) and for those that can cause non-carcinogenic, but adverse, health effects.

In general, a baseline risk assessment is performed in four steps: (1) data collection and evaluation, (2) exposure assessment, (3) toxicity assessment, and (4) risk characterization. Each of these steps is explained further below.

1. Data Collection and Evaluation

The data collected and described in the previous section (Section VI - Nature and Extent of Contamination) were evaluated for use in the BLRA. This evaluation involved reviewing the quality of the data to determine which are appropriate to use to quantitatively estimate the risks associated with Site soil, sediment, surface water, and groundwater. The concentrations used to determine human health risks are derived by averaging the data for each media and then calculating the upper 95th percentile confidence limit. By using this upper confidence limit, EPA can be 95% certain that the true average concentration does not exceed this level. This concentration is referred to as the reasonable maximum exposure ("RME") concentration because an individual would not reasonably be expected to be exposed to a higher concentration. The RME values calculated based on the Site data are summarized in Table 7.

Table 7 -Reasonable Maximum Exposure Point Concentrations

Contaminant	Surface Soil (mg/kg)	Sub-surface Soil (mg/kg)	Ground-water (mg/L)	Surface Water (mg/L)	Sediment (mg/kg)	Fish (mg/kg)
2,4-D			7.24E-02			
alpha-BHC	2.32E-01	3.78E+00				
beta-BHC	1.95E-01	3.22E+00				
delta-BHC			1.54E-03			
gamma-BHC	2.69E-01					
Aldrin		5.35E-02				
Dieldrin	5.59E-02		3.09E-09			
Endosulfan sulfate			3.16E-01			
gamma-chlordane		8.78E-02		2.51E-05		3.51E-01
Arochlor-1254					1.52E-01	
Arochlor-1260		5.21E-01	1.77E+00			
Phenol			5.26E+01			
2-Chlorophenol			5.23E+00			
2-Methylphenol			4.01E+01			
4-Methylphenol			5.37E+01			
2,4-Dichlorophenol			2.47E+01			
2,4,6-Trichlorophenol			1.08E+02			
Carbon disulfide			1.45E+00			
1,2-Dichloroethane			1.44E+00			
Trichloroethene			1.45E+00			
1,1,2-Trichloroethane			1.45E+00			
Benzene			2.19E+01			
Chlorobenzene			1.45E+00			
Naphthalene	2.39E+01					
Benzo(a)anthracene		6.36E+00	2.03E+00			
Chrysene		5.55E+01				
Benzo(b)fluoranthene		8.32E+00	2.54E+00			
Benzo(k)fluoranthene		2.98E+00				
Benzo(a)pyrene		5.10E+00	1.37E+00			

Table 7 -Reasonable Maximum Exposure Point Concentrations

Contaminant	Surface Soil (mg/kg)	Sub-surface Soil (mg/kg)	Ground-water (mg/L)	Surface		Fish (mg/kg)
				Water (mg/L)	Sediment (mg/kg)	
Indeno(1,2,3-cd)pyrene		3.82E+00	1.00E+00			
Dibenz(a,h)anthracene		1.84E+00	9.53E-01			2.25E+00
Benzo(g,h,i)perylene		3.53E+00				
Aluminum	1.55E+04	1.78E+01	1.77E+01			
Antimony			1.32E-02			1.55E-02
Arsenic	1.18E+01		4.19E-03		1.48E+01	8.80E-02
Barium	2.31E+02		3.67E-01			
Beryllium	1.67E+00	2.45E+00	3.54E-03		2.91E+00	9.50E-03
Cadmium			7.46E-03			
Chromium	2.80E+01		9.44E-03	9.85E-03	7.57+01	1.58E-01
Cobalt			2.20E-01			3.50E-03
Copper		6.72E+01				
Cyanide	1.84E+01					
Manganese	1.95E+03	1.58E+03	7.82E+01		2.62E+01	1.80E+01
Mercury	8.27E-01			3.49E-03		1.92E+00
Nickel			1.56E-01			
Thallium	8.62E-01					
Silver			1024E-02			
Vanadium	3.88E+01					
Zinc			3.32E+00		1.77E+03	

2. Exposure Assessment

An exposure assessment involves three basic steps: 1) identifying the potentially exposed populations, both current and future; 2) determining the pathways by which these populations could be exposed; and 3) quantifying the exposure. Under current Site conditions, the BLRA identified the following populations as having the potential for exposure to Site-related contaminants, either currently and/or in the future:

- future residents living on the Site;
- current and/or future off-site residents;
- current and/or future recreational users of the Site;
- future commercial or industrial workers at the Site; and
- trespassers.

Future residents living on the Site have the potential for exposure to Site-related contaminants through 1) ingestion of soil, sediments, surface water, and groundwater, and fish; 2) direct contact with surface water; and 3) inhalation of water vapor during showering. If the future residents obtain drinking water through a public drinking water supply, the groundwater ingestion and inhalation pathways would be eliminated. For off-site residents, similar exposure pathways exist, however, the overall potential for exposure is less. Off-site residents would only be exposed to Site soils during recreational use of the Site and Site-related contaminants in drinking water supplies from groundwater or the river would be substantially reduced.

Recreational users of the Site have the potential for exposure to Site-related contaminants through ingestion of fish, surface water, soil, and sediment as well as through direct contact with surface water. Workers at the Site could be exposed to contaminants through ingestion of Site soil and by drinking groundwater unless drinking water is provided through a public water supply. Trespassers have potential for exposure through ingestion and direct contact with Site surface water and through ingestion of Site soil.

In order to quantify the potential exposure associated with each pathway, assumptions must be made for the various factors used in the calculations. Table 8 summarizes the values used in the BLRA.

3. Toxicity Assessment

The purpose of the toxicity assessment is to weigh available evidence regarding the potential for particular contaminants to cause adverse effects in exposed individuals. Where possible, the assessment provides a quantitative estimate of the relationship between the extent of exposure to a contaminant and the increased likelihood and/or severity of adverse effects.

A toxicity assessment for contaminants found at a Superfund site is generally accomplished in two steps: 1) hazard identification, and 2) dose-response assessment. Hazard identification is the process of determining whether exposure to an agent can cause an increase in the incidence of a particular adverse health effect (e.g., cancer or birth defects) and whether the adverse health effect is likely to occur in humans. It involves characterizing the nature and strength of the evidence of causation. Dose-response evaluation is the process of quantitatively evaluating the toxicity information and characterizing the relationship between the dose of the contaminant administered or received and the incidence of adverse health effects in the administered population.

Table 8 - Exposure Assessment Factors

Exposure Factors	Soil	Sediment	Surface Water	Groundwater	Fish
INGESTION EXPOSURE PATHWAY					
Ingestion Rate:					
Adult	100 mg/day	100 mg/day	2 liters/day3	2 liters/day	54 g/day
Child	200 mg/day	200 mg/day	1 liter/day3	1 liter/day	20 g/day
Adult Worker	50 mg/day2			2 liters/day	
Adolescent1	100 mg/day		0.5 liters/day		
Exposure Frequency (EF):					
Resident	350 days/year		350 days/year3	350 days/year	
Recreational	20 days/year	20 days/year	7 days/year	350 days/year	
Worker	250 days/year4			250 days/year	
Trespasser1	50 days/year		7 days/year		
DERMAL CONTACT EXPOSURE PATHWAY					
Skin Surface Area:					
Adult			18,000 cm3		
Child			7,200 cm3	7,200 cm3	
Adolescent1			16,000 cm3		
EF:					
Recreational			7 days/year		
Trespasser1			7 days/year		
Child Bathing			350 days/year	350 days/year	
Bath Duration:			0.33 hours/day	0.33 hours/day	
INHALATION EXPOSURE PATHWAY					
Inhalation Rate: Adult			0.0139 m3/min	0.0139 m3/min	
EF:			350 days/year	350 days/year	
Shower Duration:			12 min/day	12 min/day	

1Trespasser use by adolescent
2Ingestion rate of subsurface soil estimated at 100 mg/day
3Drinking water use
4Exposure duration to subsurface soil estimated to be 120 days/year

Table 8 - Exposure Assessment Factors

Exposure Factors	Soil	Sediment	Surface Water	Groundwater	Fish
EXPOSURE ASSESSMENT CONSTANTS					
Exposure Duration:					
Adult resident	24 years	24 years		24 years	
Adult worker	25 years	1 year		25 years	
Child resident	6 years	6 years		6 years	
Adolescent trespasser	6 years				
Body Weight:					
Adult	70 kg				
Child	15 kg				
Adolescent	55 kg				
Averaging Time:	Carcinogens:		Noncarcinogens:		
Adult resident	70 years		24 years		
Child resident	70 years		6 years		
Adult worker	70 years		25 years		
Trespasser	70 years		6 years		

From this quantitative dose-response relationship, toxicity values (e.g., reference doses and slope factors) are derived that can be used to estimate the incidence or potential for adverse effects as a function of human exposure to the agent. These toxicity values are used in the risk characterization step to estimate the likelihood of adverse effects occurring in humans at different exposure levels.

For the purpose of the risk assessment, contaminants were classified into two groups: potential carcinogens and noncarcinogens. The risks posed by these two types of compounds are assessed differently because noncarcinogens generally exhibit a threshold dose below which no adverse effects occur, while no such threshold can be proven to exist for carcinogens. As used here, the term carcinogen means any chemical for which there is sufficient evidence that exposure may result in continuing uncontrolled cell division (cancer) in humans and/or animals. Conversely, the term noncarcinogen means any chemical for which the carcinogenic evidence is negative or insufficient.

Slope factors have been developed by EPA's Carcinogenic Assessment Group for estimating excess lifetime cancer risks associated with exposure to potentially carcinogenic contaminants of concern. Slope factors, which are expressed in units of (kg!d/mg) are multiplied by the estimated intake of a potential carcinogen, in mg/kg/day, to provide an upper-bound estimate of the excess lifetime cancer risk associated with exposure at that intake level. The term "upper-bound" reflects the conservative estimate of the risks calculated from the slope factor. Use of this approach makes underestimation of the actual cancer risk highly unlikely. Slope factors are derived from the results of human epidemiological studies or chronic animal bioassays to which animal-to-human extrapolation and uncertainty factors have been applied to account for the use of animal data to predict effects on humans. Slope factors used in the baseline risk assessment are presented in Table 9.

Reference doses ("RfDs") have been developed by EPA for indicating the potential for adverse health effects from exposure to contaminants of concern exhibiting noncarcinogenic effects. RfDs, which are expressed in units of mg/kg/day, are estimates of acceptable lifetime daily exposure levels for humans, including sensitive individuals. Estimated intakes of contaminants of concern from human epidemiological studies or animal studies to which uncertainty factors have been applied to account for the use of animal data to predict effects on humans. Reference doses used in the baseline risk assessment are presented in Table 9.

4. Human Health Effects

The health effects of the Site contaminants that are most associated with the unacceptable risk levels are summarized below. In most cases, the information in the summaries is drawn from the Public Health Statement in the Agency for Toxic Substances and Disease Registry's (ATSDR) toxicological profile for the chemical.

Aldrin & Dieldrin: The carbamate Insecticide Aldrin exists as a colorless crystalline solid at room temperature, having a molecular weight of 365 and melting point of 104 C. It is highly soluble in non-polar solvents but only slightly soluble in water. Aldrin is readily taken into the Body via inhalation, dermal absorption, ingestion or eye contact.

EPA considers aldrin to be a Class B2 carcinogen because it causes tumors in rats and mice. Aldrin also causes birth defects and damage to the reproductive system, liver toxicity, and central nervous system abnormalitites following chronic exposure. It is also acutely toxic, with an oral LD50(i.e., dose which is lethal to 50% of the test animals in research studies) of about 50 mg/kg. Aldrin is highly toxic to aquatic organisms, and has been associated with large-scale kills of terrestrial wildlife in treated areas.

Table 9 - Slope Factors and Reference Doses

Chemical	Slope factors (kg!d/mg) Oral	Slope factors (kg!d/mg) Inhaled	Reference Doses (mg/kg/d) Oral	Reference Doses (mg/kg/d) Inhaled
2,4-D			1.00E-02	
alpha-BHC	6.30E+00	6.30E+00		
beta-BHC	1.80E+00	1.80E+00		
delta-BHC	1.80E+00	1.79E+00		
gamma-BHC	1.30E+00		3.00E-04	
Aldrin	1.70E+01	1.72E+01	3.00E-05	
Dieldrin	1.60E+01	1.61E+01	5.00E-05	
Endosulfan sulfate			6.00E-03	
gamma-chlordane	1.30E+00	1.30E+00	6.00E-05	
Arochlor-1254	7.70E+00			
Arochlor-1260	7.70E+00			
Phenol			6.00E-01	
2-Chlorophenol			5.00E-03	
2-Methylphenol			5.00E-02	
4-Methylphenol			5.00E-03	
2,4-Dichlorophenol			3.00E-03	
2,4,6-Trichlorophenol	1.10E-02	1.09E-02		
Carbon disulfide		1.00E-01	2.86E-03	
1,2-Dichloroethane	9.10E-02	9.10E-02		2.86E-03
Trichloroethene	1.10E-02	6.00E-02	6.00E-03	
1,1,2-Trichloroethane	5.70E-02	5.60E-02	4.00E-03	
Benzene	2.90E-02	2.91E-02		1.43E-04
Chlorobenzene			2.00E-02	5.71E-03
Naphthalene			4.00E-02	
Benzo(a)anthracene	7.30E-01	6.10E-01		
Chrysene	7.30E-03	6.10E-03		
Benzo(b)fluoranthene	7.30E-01	6.10E-01		
Benzo(k)fluoranthene	7.30E-02	6.10E-02		
Benzo(a)pyrene	7.30E+00	6.10E+00		
Indeno(1,2,3-cd)pyrene	7.30E-01	6.10E-01		

Table 9 - Slope Factors and Reference Doses

Chemical	Slope factors (kg!d/mg) Oral	Slope factors (kg!d/mg) Inhaled	Reference Doses (mg/kg/d) Oral	Reference Doses (mg/kg/d) Inhaled
Dibenz(a,h)anthracene	7.30E+00	6.10E+00		
Benzo(g,h,i)perylene				
Aluminum			2.90E+00	
Antimony			4.00E-04	
Arsenic	1.75E+00	1.51E+01	3.00E-04	
Barium			7.00E-02	1.43E-04
Beryllium	4.30E+00	8.40E+00	5.00E-03	
Cadmium		6.30E+00	5.00E-04	
Chromium		4.20E+01	5.00E-03	
Cobalt				
Copper			3.71E-02	
Cyanide			5.00E-03	
Manganese			5.00E-03	1.14E-04
Mercury			3.00E-04	8.57E-05
Nickel			2.00E-02	
Thallium			8.00E-05	
Silver			5.00E-03	
Vanadium			7.00E-03	
Zinc			3.00E-01	

Antimony: Antimony can enter the body by absorption from the gastrointestinal tract following ingestion of food or water containing antimony, or by absorption from the lungs after inhalation. Ingestion of high doses of antimony can result in burning stomach pains, colic, nausea, and vomiting. Long-term occupational inhalation exposure has caused heart problems, stomach ulcers, and irritation of the lungs, eyes, and skin. The critical or most sensitive noncarcinogenic effects of exposure to antimony are shortened life span, reduced blood glucose levels, and altered cholesterol levels. Existing data suggest that antimony may be an animal carcinogen but are not sufficient to justify a quantitative cancer potency estimate at this time. In laboratory rats, inhalation of antimony dust can increase the risk of lung cancer. However, there is no evidence of increased risk of cancer to animals from eating food or drinking water containing antimony. It is not known whether antimony can cause cancer in humans.

Arsenic: Arsenic is a metal that is present in the environment as a constituent of many organic and inorganic compounds. Arsenic is a known human carcinogen implicated in skin cancer in humans. Inhalation of arsenic by workers is known to cause lung cancer. Arsenic compounds cause chromosome damage animals, and humans exposed to arsenic compounds have an increased incidence of chromosomal aberrations. Arsenic compounds are reported to be teratogenic, fetoxic, and embryotoxic in some animal species. Dermatitis and associated lesions are attributable to arsenic coming into contact with the skin, with acute dermatitis being more common than chronic. Chronic industrial exposures may be characterized by hyperkeratosis, and an accompanying hyperhidrosis (excessive sweating usually of the palms and soles of the feet).

Benzene: Benzene is readily absorbed by inhalation and ingestion, but is absorbed to a lesser extent through the skin. Most of what is known about the human health effects of benzene exposure is based on studies of workers who were usually exposed for long periods to high concentrations of benzene. Benzene is toxic to blood-forming organs and to the immune system. Excessive exposure (inhalation of concentrations of 10 to 100 ppm) can result in anemia, a weakened immune system, and headaches. Occupational exposure to benzene may be associated with spontaneous abortions and miscarriages (supported by limited animal data), and certain developmental abnormalities such as low birth weight, delayed bone formation, and bone marrow toxicity. Benzene is classified as a Group A human carcinogen based on numerous studies documenting excess leukemia mortality among occupationally exposed workers.

Beryllium: The respiratory tract is the major target of inhalation exposure to beryllium. Short-term exposure can produce lung inflammation and pneumonia-like symptoms. Long-term exposure can cause berylliosis, an immune reaction characterized by noncancerous growths on the lungs. Similar growths can appear on the skin of sensitive individuals exposed by dermal contact. Epidemiological studies have found that an increased risk of lung cancer may result from exposure in beryllium in industrial settings. In addition, laboratory studies have shown that breathing beryllium causes lung cancer in animals. However, it is not clear what cancer risk, if any, is associated with ingestion of beryllium EPA has classified beryllium as a Group B2 probable human carcinogen based on the limited human evidence and the animal data.

Chlordane: Chlordane can be absorbed by the body through dermal contact, inhalation of particulates in ambient air, and ingestion of contaminated food or soils. It may remain stored for months or years in the blood plasma or the body fat of the liver, spleen, brain, and kidneys. Little data are available on the adverse health effects of chlordane exposure in humans. Symptoms associated with human overexposure to this compound include headache, dizziness, lack of coordination, irritability, weakness, and convulsions. In humans, an acute oral lethal dose of chlordane was estimated to be between 25 and 50 mg/kg. Experimental studies exploring the health effects on animals exposed to various levels of chlordane showed an association between exposure and immunologic dysfunction, reproductive dysfunction, nervous system damage, liver damage, convulsions, liver cancer, and death. The lethal dose of chlordane in rats is estimated to be between 85 and 560 mg/kg. Some occupational epidemiology research suggests an increased cancer risk associated with human exposure to chlordane. Chronic oral treatment with chlordane resulted in significant increases in hepatocellular carcinomas in mice. The EPA has classified chlordane as belonging to Group B2 probable human carcinogens.

Chlorobenzene: Chlorobenzene is a colorless liquid with a mild aromatic odor. It is used in the manufacture of aniline, phenol, and chloronitrobenzene and as an intermediate in the manufacture of dyestuffs and many pesticides. Exposure to chlorobenzene can occur through inhalation, ingestion, eye and skin contact. Direct contact exposure can lead to eye, nose and skin irritation. Long term exposure may cause liver damage. Chlorobenzene is not classifiable as to carcinogenicity.

2-Chlorophenol: 2-Chlorophenol exists as a light amber liquid. It is used as an intermediate in the manufacture of dyestuffs, higher chlorophenol, and preservatives.
2-Chlorophenol is toxic by all routes (i.e., ingestion, inhalation, dermal contact). Effects from exposure include burns to the skin and eyes, weakness, headache, dizziness, damage to the lung, liver, and kidneys, and death from cardiac or pulmonary failure. Ingestion caused increase then decrease of respiration; blood pressure; urinary output; fever; increased bowel action; motor weakness; collapse with convulsions and death. Ingestion causes lung, liver, kidney damage and contact dermatitis. Acute exposures by all routes may cause muscular weakness, gastroenteric disturbances, severe depression and collapse. Although effects are primarily on the central nervous system, edema of the lung and injury of pancreas and spleen also my occur. Oral exposure may produce rapid circulatory collapse and death. Chronic poisoning from oral or percutaneous absorption may produce digestive disturbances, nervous disorders with faintness, vertigo, mental changes, skin eruptions, jaundice, oliguria, and uremia. 2-Chlorophenol has been shown to increase conception rate, decrease litter sizes of exposed rats and to increase the percent of stillborn pups.

Cresols: Three types of closely related cresol exist: ortho-cresol (o-cresol), meta-cresol (m-cresol), and para-cresol (p-cresol). Pure cresol are colorless chemicals, but they may be found in brown mixtures such as creosote and cresylic acids (e.g., wood preservatives). Cresol in air quickly change and break down into smaller chemicals, some of which irritate the eyes.
if you were to eat food or drink water contaminated with very high levels of cresol, you might feel a burning in the mouth and throat as well as stomach pains. If your skin were in contact with a substance containing high cresol levels, you might develop a rash or severe irritation. In some cases, a severe chemical burn might result. If you came into contact with high enough levels of cresol, for example, by drinking or spilling on your skin a substance containing large amount of cresol, you might become anemic, experience kidney problems, become unconscious, or even die. Studies in animals have not found any additional effects that would occur after long-term exposure to lower levels of cresol. It is possible that some of the effects in humans listed above, such as kidney problems and anemia, might occur at lower levels if exposure occurs over a longer time period. Effects on the nervous system, such as loss of coordination and twitching of muscles, are produced by low levels of cresol in animals, but we do not know whether low levels also cause such effects in humans. Cresol may enhance the ability of carcinogenic chemicals to produce tumors in animals, and they have some ability to interact with mammalian genetic material in the test tube, but they have not been shown to produce cancer in humans or animals. The EPA has determined that cresol are possible human carcinogens. Animal studies suggest that cresol probably would not produce birth defects or affect reproduction in humans.

1,2,-Dichloroethane (1,2-DCA): The lungs, heart, liver, and kidneys are the organs primarily affected in both humans and animals exposed to 1,2-DCA. Short-term exposure to 1,2-DCA in air may result in an increased susceptibility to infection and liver, kidney, and/or blood disorders. Effects seen animals after long-term exposure to 1,2-DCA included liver, kidney, and/or heart disease, and death. 1,2-DCA has caused increased numbers of rumors in laboratory animals when administered in high doses in the diet or on the skin, and is classified as a Group B2 probable human carcinogen.

2,4-Dichlorophenol: 2,4-Dichlorophenol is a white solid, the form in which it is usually sold and used. 2,4-Dichlorophenol evaporates slightly faster than water, which evaporates slowly. It can also burn. Most of the 2,4-dichlorophenol made is used directly to make other chemicals, especially chemicals that kill weeds and other plants. 2,4-dichlorophenol also is used to kill germs. Reports describing possible 2,4-dichlorophenol poisoning of factory workers suggest that if you breathe air containing 2,4-dichlorophenol for several years, you may da your liver, skin, and possibly your kidneys. Skin contact with it over a long period may cause the same effects. Animals that have eaten large amounts of 2,4-dichlorophenol in food immediately developed rapid breathing, muscle tremors, convulsions, weakness hunched posture, loss of consciousness, and some even died. Animals that took smaller amounts of it in food or water over a long period of time had damaged livers, kidneys, spleens, bone marrow, and may also have damaged their respiratory tracts (although this may have been from breathing in the chemical rather than from swallowing it). Rats that drank water containing 2,4-dichlorophenol had some changes in the immune system, but the effects of 2,4-dichlorophenol on the immune system have not been fully studied. It is not known whether the same effects would happen in people if they were exposed in the same way. Some pregnant animals that drank water containing high levels of 2,4-dichlorophenol died, and those that drank enough to become sick had spontaneous abortions or gave birth to offspring that had low birth weights. Therefore, pregnant women who unknowingly eat or drink 2,4-dichlorophenol could harm themselves and their unborn babies. The EPA has not classified 2,4-dichlorophenol as a carcinogen.

Hexachlorocyclohexane (HCH): Hexachlorocyclohexane (HCH), formerly known as benzene hexachloride (BHC) and other common names, is a synthetic chemical that exists in eight chemical forms (called isomers). One of these forms, gamma-HCH (or Y-HCH, commonly known as lindane), was once used as an insecticide on fruit, vegetable, and forest crops. It is still used in the United States and in other countries as a human medicine to treat head and body lice and scabies, a contagious skin disease caused by mites. It is a white solid that may evaporate into the air.

The effects of breathing gamma-HCH and/or alpha-, beta-, and delta-HCH seen in humans are blood disorders, dizziness, headaches, and changes in the levels of sex hormones. These effects have occurred in workers exposed to HCH vapors during pesticide manufacture. People who have swallowed large amounts have had seizures and even died. A few people who have used very large amounts of gamma-HCH on their skin have had blood disorders or even seizures. Animals that have been fed gamma- and alpha-HCH have had convulsions, and animals fed beta-HCH have become comatose. All isomers can produce liver and kidney disease. Reduced ability to fight infection was reported in animals fed gamma-HCH, and injury to the ovaries and testes was reported in animals fed gamma-HCH or beta-HCH. In animals, exposure by mouth to gamma HCH during pregnancy may cause an increased number of fetuses with extra ribs. HCH isomers are changed by the body into other chemical products, some of which may be responsible for the harmful effects. Long-term oral administration of alpha-HCH, beta HCH, gamma-HCH, or technical-grade HCH to laboratory rodents has been reported to result in liver cancer. The EPA has classified HCH as a Group B2 probable human carcinogen.

Manganese: Following inhalation of manganese dust, absorption into the bloodstream occurs only if particles are sufficiently small to penetrate deeply into the lungs. Long-term inhalation of manganese dust may result in a neurological disorder characterized by irritability, difficulty in walking, and speech disturbances. Short-term inhalation exposure has been associated with respiratory disease. There are few reports of negative health effects in humans exposed to manganese in drinking water or food. Laboratory studies of animals exposed to manganese in water or food have demonstrated adverse health effects including changes in brain chemical levels, low birth weights in rats when mothers were exposed during pregnancy, slower than usual testes development, decreased body weight gain, and weakness and muscle rigidity in monkeys. There are no human carcinogenicity data for manganese exposure. The data from some animal studies have shown increases in tumors in a small number of animals at high doses of manganese, but the data are inadequate to judge whether manganese can cause cancer. EPA has judge manganese not classifiable as to human carcinogenicity (Group D).

Mercury: Human exposure to inorganic mercury is mainly through inhalation or ingestion. Most dietary inorganic mercurials dissociate to divalent mercury in the gastrointestinal tract and are poorly absorbed. Occupational studies have demonstrated that chronic exposure to metallic mercury vapor via inhalation primarily affects the central nervous system and the kidneys. Human exposure to organic (usually methyl) mercury is mainly through ingestion. Methyl mercury compounds are known to be toxic via oral exposure, and fetuses and newborn infants are particularly susceptible. Subchronic methyl mercury poisoning occurred in humans eating contaminated fish from Minamata Bay, Japan, from 1953 to the 1960s. The medial level of total mercury in fish in Minamata Bay was estimated to be about 11 mg/kg fresh weight. Methyl mercury poisoning also occurred from eating bread produced from seed grain dressed with methyl mercury fungicide. Nerve damage causing "pins and needles" sensations in the hands and feet occurred at an estimated body burden of 25 mg of methyl mercury. No confirmed positive reports of methyl mercury carcinogenicity in humans has appeared to date, and animal experiments have generally yielded negative results.

Polycyclic Aromatic Hydrocarbons (PAHs): PAHs are a group of chemicals that are formed by the incomplete burning of coal, oil, gas, garbage, tobacco, or almost any other organic substance. Natural sources include forest fires and volcanoes. Consequently, PAHs occur naturally throughout the environment in the soil and other environmental media. Reproductive effects have occured in animals that were fed certain PAHs. Long-term ingestion of PAHs in food has resulted in adverse effects on the liver and blood in mice. Those effects may also occur in humans, but there is no exposure data to substantiate that adverse impacts in humans have, in fact, occurred. No information is available from human studies to determine what non-cancerous adverse health effects, if any, may result from exposure to specific levels of the individual PAHs, although inhalation and skin exposures to mixtures containing PAHs have been associated with cancer in humans. The levels and lengths of exposure to the individual PAHs that effect human health cannot be determined from the human studies available. Therefore, evaluation of non-cancer adverse health effects that may result from exposure is somewhat uncertain. EPA classifies a small group of PAHs as B2 probable human carcinogens. Benzo(a)pyrene is the most potent of the carcinogenic PAHs. Several PAHs have caused cancer in laboratory animals through ingestion, skin contact, and inhalation. Reports from human studies show that individuals exposed to mixtures of other compounds and PAHs by breathing or through skin contact for long period of time can also develop cancer.

Polychlorinated Biphenyls (PCBs): PCBs can enter the body when fish, other foods, or water containing PCBs are ingested, when air that contains PCBs is breathed, or when skin comes in contact with PCBs. Skin irritations characterized by acne-like lesions and rashes and liver effects were the only significant adverse health effects reported in PCB-exposed workers. Epidemiological studies of workers occupationally exposed to PCBs thus far have not found any conclusive evidence of an increased incidence of cancer in these groups. Effects of PCBs in experimentally exposed animals include liver damage, skin irritations, death, low birth weights, and other reproductive effects. Some strains of rats and mice that were fed PCB mixtures throughout their lives showed increased incidence of cancer of the liver and other organs.

Based on these animal studies, the EPA has classified PCBs as Group B2 probable human carcinogens.

1,1,2-Trichloroethane(1,1,2-TCA): No case reports or epidemiological studies regarding human occupational or environmental exposure are available. Studies with various animals, however, suggest that 1,1,2-TCA can enter the body following inhalation of contaminated air, ingestion of or dermal contact with contaminated drinking water, or through dermal contact with the solvent itself. 1,1,2-TCA is a central nervous system depressant. It has narcotic properties and can act as a local irritant to the eyes, nose, and lungs. 1,1,2-TCA is also associated with both liver and kidney damage. 1,1,2-TCA may be carcinogenic. It caused liver tumors in mice, but not rats, chronically fed 1,1,2-TCA. No other studies have shown evidence of carcinogenicity, however. Further studies with rats using higher concentrations, and other species would improve the knowledge of 1,1,2-TCA carcinogenicity. Based upon the present evidence from animal studies, the EPA considers 1,1,2-TCA a Group C possible human carcinogen.

Trichloroethylene: Trichloroethylene is a colorless, nonflammable, noncorrosive liquid primarily used as a solvent in vapor degreasing. It is also used as a dry-cleaning agent, and as a chemical intermediate in the production of paints and varnishes and other chemicals. Trichloroethylene has low acute toxicity. Chronic inhalation exposure to trichloroethylene has been shown to cause liver, kidney, and nervous system disorders and skin irritation in animals. The EPA has classified trichloroethylene as a Group B2-C carcinogen.

2,4,6-Trichlorophenol: 2,4,6-Trichlorophenol is a man-made chemical that appears as a yellow solid. It has a strong, sweet smell and does not burn easily. It does not occur naturally. In the past, the major uses of 2,4,6-trichlorophenol were as an antiseptic and pesticide. Its uses also included preserving wood, leather and glue, and preventing the building of mildew on fabric. In the environment, 2,4,6-trichlorophenol is found most frequently in water, especially near hazardous waste sites contaminated with 2,4,6-trichlorophenol. 2,4,6-Trichlorophenol can evaporate into the air. The human health effects of 2,4,6-trichlorophenol are not known. However, it is possible that health effects observed in animals following exposure to 2,4,6-trichlorophenol could occur in humans. No information was found on short-term animal studies. However, results of long-term animal studies show that 2,4,6-trichlorophenol causes changes in liver and spleen cells, and lowers body weight. Long-term exposure to high levels of 2,4,6-trichlorophenol causes death in some animals. This suggests that high levels of 2,4,6-trichlorophenol may be life-threatening to humans. Cancer occurs in animals after continued long-term oral exposure to 2,4,6-trichlorophenol. Whether or not 2,4,6-trichlorophenol causes cancer in humans has not been adequately studied. However, because 2,4,6-trichlorophenol causes cancer in animals, it is possible that 2,4,6-trichlorophenol could cause cancer in humans. The EPA has classified 2,4,6-trichlorophenol as a Group B2 probable human carcinogen. 2,4,6-Trichlorophenol has not been studied to determine if it causes birth defects, but 2,4,6-trichlorophenol has been shown in animals to cause lowered body weight in newborns and a decrease in the number of offspring. The higher the level of exposure and the longer the exposure to 2,4,6-trichlorophenol, the greater the chance for adverse health effects.

5. Risk Characterization

The risk characterization process integrates the toxicity and exposure assessments into a quantitative expression of risk. For carcinogens, the exposure point concentrations and exposure factors discussed earlier are mathematically combined to generate a chronic daily intake value that is averaged over a lifetime (i.e., 70 years). This intake value is then multiplied by the toxicity value for the contaminant (i.e., the slope factor) to generate the incremental probability of an individual developing cancer over a lifetime as a result of exposure to the contaminant. The National Oil and Hazardous Substances Pollution Contingency

Plan ("NCP") established acceptable levels of carcinogenic risk for Superfund sites ranging from one excess cancer case per 10,000 people exposed to one excess cancer case per one million people exposed. This translates to a risk range of between one in 10,000 and one in one million additional cancer cases. Expressed as scientific notation, this risk range is between 1.0E-04 and 1.0E-06. Remedial action is warranted at a site when the calculated cancer risk level exceeds 1.0E-04 However, since EPA's cleanup goal is generally to reduce the risk to 1.0E-06 or less, EPA also may take action where the risk is within the range between 1.0E-04 and 1.0E-06.

The potential for noncarcinogenic effects is evaluated by comparing an exposure level over a specified time period (i.e., the chronic daily intake) with the toxicity of the contaminant for a similar time period (i.e., the reference dose). The ratio of exposure to toxicity is called a hazard quotient. A Hazard Index ("HI") is generated by adding the appropriate hazard quotients for contaminants to which a given population may reasonably be exposed. The NCP also states that sites should not pose a health threat due to a non-carcinogenic, but otherwise hazardous, chemical. If the HI exceeds one (1.0), there may be concern for the potential non-carcinogenic health effects associated with exposure to the chemicals. The HI identifies the potential for the most sensitive individuals to be adversely affected by the noncarcinogenic effects of chemicals. As a rule, the greater the value of the HI above 1.0, the greater the level of concern.

Table 10 summarizes the total risk levels from all appropriate exposure routes calculated for each group of individuals.

B. Ecological Risk Assessment

Neville Land Company and EPA collectively evaluated the ecological risks associated with the Site. Based on these evaluations, contamination in all media (i,e., surface water, sediment, soil, and groundwater) have the potential to have significant adverse impacts on the aquatic ecosystem of the river. In surface water, concentrations of mercury, copper, and chromium (VI)

Table 10 - Human Health Risks at the Site

Group of Individuals	Cancer Risk	Hazard Index
On-Site Residents consuming groundwater	4.54E-02	10,000
On-Site Residents on public water supply	3.00E-04	26.3
Off-Site Residents consuming groundwater from the Site	2.24E-04	1,710
Off-Site Residents consuming river water that came from the Site	1.86E-04	25.3
Recreational Site Users	1.85E-04	25.0
On-Site Workers consuming groundwater	1.48E-02	732
On-Site Workers on public water supply	1.45E-05	0.0234
Trespassers	3.35E-06	0.0294

are potential harmful to the Main Channel of the Ohio River while chromium and copper present an ecological risk in the Back Channel. Contaminants of ecological significance in the sediment adjacent to the Site in both the Main Channel and the Back Channel include heavy metals, pesticides, PCBs, and SVOCs, particularly phenols. In soil at the Site, metal contaminants including arsenic, copper, lead, manganese, mercury and zinc are present at levels that have a high potential to affect ecological receptors. Other soil contaminants, mostly PAHs and pesticides, were found above background levels and could also result in adverse impacts. Groundwater, which is a pathway by which soil contaminants reach the river, is contaminated by several contaminants of ecological concern, particularly mercury, zinc, phenols and phthalates. Pesticides and chlorocarbons are also of concern. Given the level of contamination in surface water and sediment, soil contaminants from the Site are suspected to have contributed to degradation of the river.

VIII. DESCRIPTION OF ALTERNATIVES

In the Feasibility Study ("FS"), engineering technologies applicable to remediating the contaminated media were screened according to their effectiveness and implementability. Those technologies remaining after the screening process were then developed into remedial alternative. The alternatives in the FS address the following media: soil, groundwater, surface water, and sediment. This ROD focuses exclusively on soft and buried waste remediation; therefore, the FS alternatives were revised to include only cleanup activities associated with soil and buried waste remediation.

Alternative 1: No Action

Capital Cost:5	0
Present Worth Cost:	0
Annual O&M Cost	0
Time to Implement:	0

Section 300.430(e)(6) of the NCP requires that EPA consider a "No Action" alternative for every Superfund site to establish a baseline or reference point against which each of the remedial action alternatives are compared. In the event that the other identified alternatives do not offer substantial benefits in the reduction of toxicity, mobility, or volume of the constituents of concern, the No Action alternative may be considered a feasible approach. This alternative leaves the Site undisturbed and all current and potential future risks would remain.

[5 The costs provided in this document are estimates to be used solely for the purpose of comparative analysis.]

Alternative 2: Multilayer Cap, Surface Water Runoff Controls, Monitoring, and Institutional Controls

Capital Cost:	$2,127,981
Total Present Worth Cost:	$3,647,981
Annual Cost: Monitoring6	$ 80,000
O&M7	$ 40,000
Time to Implement:	1 year

This Alternative is based upon Alternative 4C from the FS, as modified by EPA, and includes the following components:

A multilayer cap designed in accordance with Pennsylvania Residual Waste Management Regulations would be installed over the area of the Site where wastes are buried (Figure 2).

This multilayer cap would reduce the rate at which precipitation infiltrates through the soil and buried waste and into the groundwater. The multilayer cap would also reduce the risk of direct exposure to the soil contaminants and control migration of contaminated soils. The actual size and location of the multilayer cap would be determined during the remedial design phase of the project. The multilayer cap would cover areas where concentrated wastes are present, including the trench areas.

Areas that are not covered by the multilayer cap but still exhibit low levels of Site contaminants would be covered by an erosion cap consisting of a soil cover and vegetation. In some areas, the existing soil cover and vegetation provides an adequate erosion cover. Other areas will require improvement. Areas used in the future for commercial/industrial development would need to establish and maintain an erosion cap in areas where low level contamination is present.

To ensure the integrity of the multilayer cap, the on-site oil well would need to be properly abandoned in accordance with Pennsylvania Oil and Gas Well Regulations. In addition, the remedial design for the multilayer cap would need to permit access to the active oil pipeline for maintenance or provide for relocation of the pipeline.

A passive type of gas collection system using gas vents would be designed in accordance with Pennsylvania Residual Waste Management Regulations and installed to ensure the integrity of the cap.

An engineered surface water runoff and erosion control system would be designed and installed to control transport of surface soil both on- and off-site. The system would consist of grass

[6 The cost for monitoring in Alternatives 2, 3, and 4 was estimated for three years.]

[7 The cost for O&M in Alternatives 2, 3, and 4 was estimated for 30 years.]

drainage swales constructed along the perimeter of the Site near the Main and Back Channel shorelines. The swales would be designed in accordance with applicable regulations and design standards and would be connected directly with three sedimentation basins constructed near the existing storm water runoff outfall structures.

Operation and Maintenance of the multilayer cap, erosion cap, gas collection system, and surface water control system would be routinely performed to ensure all components of the remedy continue to function properly and achieve their performance requirements.

A monitoring program would be implemented to assess the remedy's effectiveness in limiting further migration of Site contaminants into the groundwater, surface water and sediment at the Site. The sample collection location and analytical requirements would be developed during the remedial design. This monitoring program may be expanded based on the finding in the OU3 investigation to include additional groundwater monitoring to ensure that off-site migration of contaminants is being adequately controlled.

Institutional controls would be implemented to restrict land and groundwater use at the Site and reduce the potential for human exposure to contamination. Deed restrictions would be required to eliminate the future possibility of residential development and/or use of groundwater at the Site. Permanent warning signs would also be posted at the Ohio River banks to warn potential fishermen against eating bottom-feeding fish.

Alternative 3: Waste Material Stabilization, Multilayer Cap, Surface Water Runoff Controls, Monitoring, and Institutional Controls

Capital Cost:	$13,073,031
Total Present Worth Cost:	$14,593,031
Annual Cost: Monitoring	$ 80,000
O&M	$ 40,000
Time to Implement	2 years

This alternative is based upon Alternative 7 in the FS with modifications by EPA. This alternative is similar to Alternative 2 described above with the exception of the remedy for the concentrated waste buried in trenches at the Site. These buried wastes would be stabilized under this alternative prior to being covered with a multilayer cap as in Alternative 2. Stabilization would be accomplished on-site by large-scale mechanical mixing of waste materials (and the soil in the areas contiguous to the waste materials) with chemical reagents and/or cements of various types. Stabilization decreases the mobility and direct exposure potential of surface soil and buried waste. Additional sampling to determine the range of composition of the waste materials would be required before a suitable selection of binding materials could be made. Because the wastes were deposited at various times over a long period, their compositions may not be homogeneous. Therefore, stabilization may require the use of a variety of binding materials specific to each trench and possibly to various regions within each trench. Additional analysis and treatability testing would be required during the remedial design to locate and characterize the type and the volume of material to be stabilized.

Alternative 4: Waste Material Removal, Multilayer Cap, Surface Water Runoff Controls, Monitoring, and Institutional Controls

Capital Cost:	$22,082,556
Total Present Worth Cost:	$23,602,556
Annual Cost: Monitoring	$ 80,000
O&M	$ 40,000
Time to Implement:	2 years

This Alternative is based upon Alternative 8 in the FS, as modified by EPA. Under this alternative, the concentrated waste buried in the on-site trenches would be excavated and transported off-site for subsequent disposal in a licensed waste facility. Following excavation, the trench areas would be backfilled with clean soil. The remaining components of the remedy, including the multilayer cap and the groundwater extraction and treatment requirements, would be the same as those described in Alternative 2.

IX. COMPARATIVE EVALUATION OF ALTERNATIVES

Each of the four (4) remedial alternatives summarized in this ROD has been evaluated against the nine evaluation criteria set forth in the NCP, 40 C.F.R. Section 300.430(e)(9). These nine criteria can be categorized into three groups: threshold criteria, primary balancing criteria, and modifying criteria. A description of the evaluation criteria is presented below:

Threshold Criteria:

1. Overall Protection of Human Health and the Environment addresses whether a remedy provides adequate protection and describes how risks are eliminated, reduced, or controlled.

2. Compliance with Applicable or Relevant and Appropriate Requirements (ARARs) addresses whether a remedy will meet all of the applicable, or relevant and appropriate requirements of environmental statutes.

Primary Balancing Criteria:

3. Long-term Effectiveness refers to the ability of a remedy to maintain reliable protection of human health and the environment over time once cleanup goals are achieved.

4. Reduction of Toxicity, Mobility, or Volume through Treatment addresses the degree to which alternatives employ recycling or treatment that reduces toxicity, mobility, or volume of contaminants.

5. Short-term Effectiveness addresses the period of time needed to achieve protection and any adverse impacts on human health and environment that may be posed during the construction and implementation period until cleanup goals are achieved.

6. Implementability addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

7. Cost includes estimated capital, operation and maintenance costs, and present worth costs.

Modifying Criteria:

8. State Acceptance indicates whether, based on its review of backup documents and the Proposed Plan, the State concurs with, opposes, or has no comment on the preferred alternative.

9. Community Acceptance includes assessments of issues and concerns the public may have regarding each alternative based on a review of public comments received on the Administrative Record and the Proposed Plan.

A. Overall Protection of Human Health and the Environment

A primary requirement CERCLA is that the selected remedial alternative be protective of human health and the environment. A remedy is protective if it reduces current and potential risks to acceptable levels under the established risk range posed by each exposure pathway at the Site.

Alterative 1 would not adequately reduce direct exposure to contaminants present in soil and would not control migration of these contaminants from the Site. Both current and potential future users of the Site would be exposed to elevated human health risks as indicated previously in Table 10 in this ROD. In addition, adverse ecological impacts would continue unabated at the Site. Because this alternative does not meet the threshold criteria of protection of human health and the environment, it will not be considered further in this analysis.

Alternatives 2, 3 and 4 are all protective of human health and the environment. Each of these alternatives reduces the potential for exposure to and migration of Site contaminants, but each does it in a different way. Under Alternative 2, the wastes and contaminated soil remain in place, but their potential for further migration is reduced by placing an impermeable multilayer cap over them. Alternative 3 stabilizes the concentrated wastes to immobilize the contaminants prior to construction of the multilayer cap. Alternative 4 removes the concentrated waste, backfills the excavated areas with clean soil, and covers these areas along with other areas of contaminated soil with a multilayer cap. The alternatives also include institutional controls to restrict use of the Site to prevent potential exposure to any remaining contaminants.

Although Alternative 2, 3 and 4 are all effective in protecting human health and the environment, each does involve different tradeoffs as to other factors such as permanence and cost which will be discussed below under those criteria.

B. Compliance with Applicable or Relevant and Appropriate Requirements (ARARS)8

Any cleanup alternative considered by EPA must comply with all applicable or relevant and appropriate federal and state environmental requirements. Applicable requirements are those substantive environment standards, requirements, criteria, or limitations promulgated under federal or state law that are legally applicable to the remedial action to be implemented at the Site. Relevant and appropriate requirements, while not being directly applicable, address problems or situations sufficiently similar to those encountered at the Site that their use is well-suited to the particular site. Alternative 2, 3, and 4 would be required to comply with the following ARARs, as appropriate:

Chemical-Specific ARARs

There are currently no ARARs establishing acceptable concentrations for contaminants in soil at the Site. However, the Pennsylvania Land Recycling Technical Manual, Appendix B2, is a guideline to be considered in implementation of the remedy.

PADEP has identified the Land Recycling and Environmental Remediation Standards Act ("Act 2") as an ARAR for this remedy. EPA has determined that Act 2 does not, under the facts and circumstances of this remedy, impose any requirements more stringent than the federal standards.

Location Specific ARARs

Floodplain:

Federal Executive Order 11988 on Floodplain Management, which requires federal agencies to reduce the risk of flood loss, to minimize the impact of floods, and to restore and preserve the natural and beneficial values of floodplains, is "to be considered" during any remedial activity under Alternatives 2, 3 and 4.40 C.F.R. Part 6, Appendix A sets forth the "Statement of Procedures on Floodplain Management and Wetlands Protection."

The Pennsylvania Solid Waste Disposal Act (SWDA) and is implementing regulations at 25 Pa.

[8Under Section 121(d) of CERCLA, 42 U.S.C. § 9621 (d), and EPA guidance, remedial actions at CERCLA sites must attain legally applicable or relevant and appropriate federal and promulgated state environmental standards, requirements, criteria and limitations which are collectively referred to as "ARARs", unless such ARARs are waived under Section 121(d)(4) of CERCLA, 42 U.S.C. § 9621(d)(4).]

Code Chapter 269, Subchapter A sets forth requirements for siting hazardous waste treatment and disposal facilities. Section 269.22 prohibits the siting of surface impoundments, landfills, land treatment facilities, and treatment and incineration facilities within the 100-year floodplain. These regulations are applicable to any hazardous waste treatment activity in Alternative 3, since a portion of the Site is within the 100-year floodplain.

Action-Specific ARARs

Multilayer Cap:

The Pennsylvania Residual Waste Management Regulations, 25 Pa. Code Chapter 288, Subchapter C, regarding the closure of landfills are relevant and appropriate to the covering or capping of the landfilled industrial waste materials in Alternatives 2, 3, and 4. Relevant provisions include 288.212 (access control), 288.234 (final cover and grading), 288.262 (gas Control monitoring), 288.236 (revegetation), 288.237 (standards for successful revegetation), 288.242 (soil erosion and sedimentation control), and 288.181 and 288.291 (postclosure land use plan). Additional maintenance for caps set forth in 25 Pa. Code Section 264.117 30-years time frame) are relevant and appropriate in Alternatives 2, 3 and 4.

Erosion cap:

The Pennsylvania Residual Waste Management Regulations, 25 Pa. Code Chapter 288, Subchapter C, regarding the closure of landfills are relevant and appropriate for capping of areas containing low-level contaminants Relevant provisions include Sections 288.234 (d), (e), (f), and (g) (final cover), 288.236 (revegetation), 288.237 (standards for successful revegetation), and 288.242 (soil erosion and sedimentation control).

Erosion Control/Surface Water Runoff.

Erosion control shall also be accomplished in accordance with 25 Pa.Code Chapter 102 (erosion control), Sections 102.4-24. 25 Pa. Code, Chapter 105, Subchapter B, Dams and Reservoirs, Sections 105.102-107 and 105.131-136 (for sediment pond construction and maintenance) are applicable, and §§ 288.242 and 288.243 of the Pennsylvania Residual Waste Management Regulations are relevant and appropriate.

Handling Hazardous Waste:

The Pennsylvania Hazardous Waste Management Regulations, 25 Pa. Code, Chapters 261, and 262, and 40 C.F.R Section 261.24 (toxicity characteristic), would be applicable for the identification, generation, and handling of hazardous waste generated during stabilization activities in Alternative 3 or during excavation of buried waste in Alternative 4, and hazardous liquid wastes generated during decontamination of equipment. Applicable Sections include: 262.22 (hazardous waste determination); 262.20 and 23 (manifests); and 262.30 and 33 (pretransport requirements). Regulations at 25 Pa. Code Chapter 273 are applicable to the disposal of wastes determined not to be hazardous in Alternatives 3 and 4.

25 Pa. Code Chapter 264, Subchapter G, Section 264.114 (disposal or decontamination of equipment, structures and soils) is applicable to the decontamination of equipment used in the excavation and treatment of contaminated materials in Alternatives 3 and 4.

25 Pa. Code Chapter 264 Subchapters B, C, D, F and G contain provisions that would be relevant and appropriate to the stabilization of buried wastes in Alternative 3, if any such waste is determined to be hazardous. These provisions include: Sections 264.14 and 17 (general facility standards); 264.31-34 and 37 (preparedness and prevention), Sections 264.51, 52, 55 and 56 (contingency plan and emergency procedures); Section 264.97 (general ground water monitoring requirements); 264.111, 112, 114, 117, and 118 (Closure and Postclosure).

25 Pa. Chapter 264 Subchapters I, J and L contain provisions that would be relevant and appropriate to the temporary storage of hazardous wastes on-site in containers, tanks or waste piles during excavation and treatment of buried wastes in Alternative 3 and prior to transportation of excavated wastes off-site in Alternative 4. These provisions include: Sections 254.171-179 (use and management of containers); Sections 264.192-194, 197-199 (tanks): and Sections 264.251-258 (waste piles).

Oil well Abandonment:

The Pennsylvania Oil and Gas Well Regulations, 25 Pa. Code Chapter 78, Subchapter D, Sections 78.9l-98, would be applicable to the abandonment of the on-site oil well in Alternatives 2, 3 and 4.

Air Emissions:

The State implementation Plan (SIP) for Pennsylvania as incorporated at 40 C.F.R. Part 52, Subpart NN, Section 52.2020 et seq., includes substantive State regulations, including Pennsylvania Air Quality Control Regulations, which are applicable to remedial activities generating air emissions at the Site, including earth moving activities and the construction of the gas venting system in Alternatives 2, 3 and 4. Applicable Sections include: 25 Pa. Code Sections 123.1 (prohibition of certain fugitive emissions), 123.2 (fugitive particulate matter), 123.31 (limitations on odor emissions, 123.41 (limitations on visible emissions), 123.43 (measuring techniques for opacity), 127.1 (purpose) and 127.12(a)(3)-(8) (substantive elements of permit application for a new or modified source, including use of Best Available Technology (BAT) to limit emissions) and 131.2-3 (ambient air quality standards).

The federal Clean Air Act, 42 U.S.C Section 7412, and its implementing regulations at 40 C.F.R. Part 61, establish National Emission Standards for Hazardous Air Pollutants (NESHAPs). Subpart FF (Benzene Waste Operations), Sections 61.342-345, 348, 351, 354 and 355 may be relevant and appropriate to the excavation, treatment and temporary storage of soils and buried wastes contaminated with benzene in Alternatives 2, 3 and 4.

C. Reduction of Toxicity, Mobility, or Volume through Treatment

Section 121(b) of CERCLA, 42 U.S C. Section 9621(b), establishes a preference for remedial actions which include treatment that permanently and significantly reduces the toxicity, mobility, or volume of contaminants. The multilayer cap required in Alternatives 2, 3, and 4 would stop infiltration of water through the soil, immobilizing buried waste and soil contaminants beneath the cap, and controlling further spread of contamination from the soil into groundwater, surface water,and sediment. Capping would also control the mobility of soil contaminants in the air (e.g., in dust) and create a barrier protecting Site users from direct contact with soil contaminants. Alternative 2 would not reduce the toxicity and volume of soil contaminants. Alternative 3 requires use of a treatment technology (i.e., stabilization) which would further reduce the mobility of the contaminants present in the concentrated waste buried in the trench areas. Alternative 4 requires excavating the concentrated waste and transporting it to an off-site permitted landfill specifically designed to prevent migration of contamination. If the concentrations of contaminants in the waste exceed levels established under the RCRA Land Disposal Restriction, treatment would be required prior to landfilling.

D. Implementability

This evaluation criterion addresses the difficulties and unknowns associated with implementing the cleanup technologies associated with each alternative, including the ability and time necessary to obtain required permits and approvals, the availability of services and materials, and the reliability and effectiveness of monitoring.

The installation of a multilayer cap in Alternative 2, 3 and 4 utilizes well-known construction Methods. Necessary services and materials are readily available. Additional information would be required during the remedial design to determine the exact location of buried waste in order to design the cap appropriately.

The stabilization technology used in Alternative 3 is more complicated to implement than the multilayer cap alone. Additional sampling and bench-scale laboratory treatability studies would be performed during the remedial design to determine the type and amount of solidification reagent required to adequately stabilize the waste material. Because the wastes were deposited at various times over many years, and because of their different characteristics, stabilization will require the use of a variety of binding materials, specific to each type of waste. There may be wastes present that cannot be successfully immobilized using the stabilization technology.

The excavation of waste required in Alternative 4 is a straightforward process. As with the other alternatives, additional sampling and waste characterization will be necessary to determine the location of concentrated wastes to be excavated and the appropriate landfill(s) for disposal. Because of the large volume of waste involved, transportation costs could substantially increase if appropriate landfill facilities with capacity for the waste are located at a significant distance from the Site.

E. Short-Term Effectiveness

Alternatives 2, 3 and 4 could pose an increased short-term health risk to on-site construction workers and/or trespassers during earth-moving activities to construct the multilayer cap. These activities have the potential to release volatile contaminants that may be present in the soil or waste material. Alternative 3 has the potential for somewhat higher short-term health risks because the stabilization process requires mixing contaminated wastes with the binding agents and a greater release of volatile contaminants could occur. Alternative 4 could pose short-term risks similar to or higher than Alternative 3 because the concentrated wastes will be excavated. In all cases, however, these short-term risks could be minimized using standard safety measures.

F. Long-term Effectiveness and Permanence

Alternatives 2, 3 and 4 provide a permanent and effective long-term remedy by requiring regular and continuing maintenance of the multilayer cap. The construction of the multilayer cap would eliminate the risk associated with direct contact with contaminants at the Site and would reduce mobility of groundwater contaminants. The degree of long-term effectiveness and permanence increases with Alternatives 3 and 4. By immobilizing the contaminants through treatment, Alternative 3 relies less on continued maintenance of the multilayer cap to achieve long-term effectiveness and permanence. Similarly, Alternative 4 completely removes the concentrated wastes from the Site, thereby eliminating the possibility of any future risks at the Site from these wastes and further increasing the long-term effectiveness and permanence. The monitoring program would evaluate the ongoing effectiveness and permanence of Alternatives 2, 3 and 4.

G. Cost

Evaluation of costs of each alternative generally includes the calculation of direct and indirect capital costs and the annual operation and maintenance (O&M) costs, both calculated on a present worth basis. The total present worth cost of Alternatives 2, 3 and 4 has been calculated for comparative purposes and is presented in Table 11.

Table 11
Estimated Cost of Alternative

Alternative	Total Present Worth Cost
2	$3,647,981

3	$14,593,031
4	$23,602,556

Direct capital costs include costs of construction, equipment, building and services, and waste disposal. Indirect capital costs include engineering expenses, start-up and shutdown, and contingency allowances. Annual O&M costs include labor and material; chemicals, energy, and fuel; administrative costs and purchased services; monitoring costs; costs for periodic site review (every five years); and insurance, taxes, and license costs. For cost estimation purposes, a period of 30 years has been used for O&M. In reality, maintenance of a multilayer cap would be expected to continue beyond this period. The actual cost for each alternative is expected to be in a range from 50 percent (50%) higher than the costs estimated to 25 percent (25%) lower than the costs estimated. The evaluation was based on the FS cost estimates, as modified by EPA.

H. State Acceptance

The Commonwealth of Pennsylvania has had the opportunity to review and comment on all the documents in the Administrative Record and has participated in selecting the remedy for this Site. The State has had the opportunity to comment on the draft ROD and, to the extent possible, the Commonwealth's comments have been incorporated into the ROD. The State's formal position the selected remedy is forthcoming.

I. Community Acceptance

The community has been in general agreement with the alternative selected in this ROD. Coraopolis Township and Neville Land Company have been familiar with EPA's preferred plan for soil remediation at the Site and voiced no opposition. Oral and written comments on the remedial alternative evaluated by EPA for the implementation at the Site are included in Part III of this ROD.

X. SELECTED REMEDY AND PERFORMANCE STANDARDS

Based upon consideration of the requirements of CERCLA, the detailed analysis of the alternatives using the nine criteria, and public comments, EPA has determined that Alternative 2: Multilayer Cap, Surface Water Runoff Controls, Monitoring and Institutional Controls is the most appropriate remedy for the Ohio River Park Superfund Site. The major components of the remedy and the required performance standards are listed below.

A. Multilayer Cap Performance Standards

The multilayer cap shall achieve the following:

1. The multilayer cap shall cover the areas where waste material has been disposed including the trench area shown in Figure 2 and shall cover surrounding soil where the following contaminant concentrations are exceeded9:

   Benzo(a)anthracene .... 7,800 ppb
   Benzo(a)pyrene .... 780 ppb.

2. The multilayer cap shall protect Site users from being exposed to the soil contaminants, listed in Table 6, that pose an unacceptable human health risk either by the direct contact with contaminated waste/soil or by inhalation/ingestion of soil dust.

3. The multilayer cap shall achieve a permeability of 10-7 cm/sec or less to minimize infiltration of water through the buried waste and into the groundwater.

4. The multilayer cap shall control water and air erosion of the soil into surface water, groundwater and air.

5. The multilayer cap shall be designed and constructed in accordance with the Pennsylvania Residual Waste Management Regulations, 25 Pa. Code Chapter 288, Subchapter C, regarding the closure of landfills. Relevant provisions include, but are notlimited to, 288.212 (access control), 288.234 (final cover and grading), 288.262 (gas control monitoring), 288.236 (revegetation), 288.237 (standards for successful revegetation), 288.242 (soil erosion and sedimentation control) and 288.181, 288.291 (cap maintenance). In the event the future use of the Site would require an alternate cap design, this alternate cap design shall meet industry standards for stability, compressive strength and bearing capacity.

6. The multilayer cap shall be designed and constructed to function with minimum maintenance, to minimize water and air erosion of the cover into surface water, groundwater and air, to accommodate settling so that the integrity of the cover is maintained, and to provide adequate freeze protection for the liner.

7. The multilayer cap shall sufficiently overlap the area of the former disposal trenches to minimize infiltration of water through the buried waste.

8. The multilayer cap shall be revegetated and vegetation maintained in such a way as to provide habitat for indigenous and migratory terrestrial resources to the maximum extent practicable without endangering the cap's integrity.

9. In the event that the future use of the Site would require an alternate cap design, this alternate cap design shall meet industry standards for stability, compressive strength and bearing capacity. Areas proposed for future commercial/industrial development would need to be designed to preserve the integrity of the cap.

[9These concentrations are the acceptable levels for industrial use identified in the EPA Region III Risk-Based Concentration Table dated April 19, 1996.]

B. Erosion Cap Performance Standard

An erosion cap shall be constructed over any areas not covered by the multilayer cap where Site-related contaminants have been detected if a vegetative cover adequate to prevent erosion does not currently exist or if the existing vegetative cover is disturbed by future commercial/industrial development. Adequacy or non-adequacy, existence or non-existence of a vegetative cover shall be determined during remedial design. The erosion cap shall include placement of soil, as necessary and establishment of a vegetative cover to prevent erosion of contaminants. Areas proposed for future commercial/industrial development would need to be designed to establish and maintain an erosion cap in areas where low level contamination is present.

C. On-Site Oil Well Performance Standard

The on-site well shall be abandoned in accordance with the Pennsylvania Oil and Gas Well Regulations, 25 Pa. Code Chapter 78, Subchapter D.

D. Gas Collection System Performance Standard

The gas collection system shall be implemented in accordance with the Pennsylvania Air Quality Control Regulations, 25 Pa. Code Sections 123.1, 123.31, 127.1, 127.12(a) and 131.2-3, and the Pennsylvania Residual Waste Management Regulations, 25 Pa. Code Section 288.262 (gas control monitoring).

E. Surface Water Runoff And Erosion Control System Performance Standards.

The system shall be designed in accordance with 25 Pa. Code, Chapter 105, Subchapter B, Dams and Reservoirs (for sediment pond construction and maintenance), and §§ 288.242 and 288.243 of the Pennsylvania Residual Waste Management Regulation. The system shall consist of grass drainage swales constructed along the perimeter of the Site near the Main and Back Channel shorelines. The swales shall be connected directly with three sedimentation basins constructed near the existing storm water runoff outfall structures. The system shall be inspected and maintained at least twice a year for at least 30 years. The maintenance shall include, at a minimum, reseeding and clearing debris from the swales and cleaning the sedimentation basins.

F. Operation and Maintenance Performance Standard

The multilayer cap shall be maintained in accordance with the requirements set forth in 25 Pa. Code Sections 264.117, and 288.234. The cap should be inspected and maintained at least twice a year for at least 30 years.

G. Monitoring Program Performance Standards

The monitoring program shall include, as a minimum, collection and laboratory analysis of the following:

- Twelve groundwater samples from existing monitoring wells and, pending further evaluation, installing additional monitoring wells both upgradient and downgradient of the waste trench location between the Ohio River and Coraopolis water supply wells; these samples well be analyzed for VOC, SVOC, pesticides, herbicides, and inorganics;
- Two water samples from the Coraopolis drinking water supply wells and any other municipal water supply wells found in close proximity to the Site; these samples will be analyzed for VOC, SVOC, pesticides, herbicides, and inorganics;
- Three sediment samples collected from the surface water runoff and erosion control system sedimentation basins and one sample from the Back Chanel; these samples shall be analyzed for PAHs, insecticides, herbicides, and metals;
- Four surface water samples from the Ohio River, both upstream and downstream of the Site, and water samples from any seeps discovered at the Site; these samples will be analyzed for VOC, SVOC pesticides, herbicides, and inorganics.

Groundwater samples shall be collected quarterly to evaluate potential contamination in different seasons and surface water and sediment samples semiannually. The monitoring program shall be reevaluated after three years to determine if changes are necessary. Monitoring will be continued for 30 years. If the OU-3 ROD does not require any further remedial action at the Site, but requires monitoring, the OU-3 monitoring requirements shall be incorporated into this monitoring program.

H. Institutional Controls Performance Standards

Institutional controls shall be implemented to restrict land and groundwater use at the Site and reduce the potential for human exposure to contamination. Deed restrictions shall be required to prohibit residential development, any use incompatible with the multilayer cap, and/or use of groundwater at the Site Permanent warning signs shall be posted at the Ohio River banks to warn potential fishermen against eating bottom feeding fish.

XI. STATUTORY DETERMINATIONS

This remedy satisfies remedy selection requirements of CERCLA and the NCP. The remedy is expected to be protective of human health and the environment, complies with ARARs, is cost effective, and utilizes permanent solutions. Because the contaminated materials will stay at the Site, the remedy does not include treatment as a principal element of the remedy for soils. The following is a discussion of how the selected remedial action addresses the statutory requirements.

A. Overall Protection of Human Health and the Environment

The selected remedy will provide adequate protection of human health and the environment by containing the concentrated waste and contaminated soils beneath the multilayer cap; controlling exposure to soil contaminants through water and air erosion by constructing surface water runoff control and an erosion cap; and assuring appropriate usage of the Site by imposing institutional controls. These actions will reduce the carcinogenic risk from exposure to contaminated waste/soils to commercial, industrial, and recreational Site users to within the acceptable EPA risk range of 10-4 to l0-6, and will reduce the Hazard Index to less than one for non-carcinogenic risks. This remedy will also minimize further migration of contamination into groundwater, surface water and sediment by controlling surface water infiltration through the contaminated waste/soil.

8. Compliance with Applicable or Relevant and Appropriate Requirements (ARARS)

The selected remedy will comply with the action-specific ARARs for covering landfilled industrial materials established by the Commonwealth of Pennsylvania in 25 Pa. Code, Chapter 288, Subchapter C.

C. Cost Effectiveness

EPA, has determined that the selected remedy most effectively addresses contaminated waste/soils while minimizing costs. The estimated present worth cost is $3,647,981. Other alternative were either less expensive, but ineffective, or more expensive, but only marginally more protective than the selected remedy.

D. Utilization of Permanent Solutions and Alternative Treatment (or Resource Recovery) Technologies to the Maximum Extent Practicable

EPA has determined that the selected remedy represents the maximum extent to which permanent solutions and alternative treatment technologies can be utilized in a cost-effective manner at the Site. The selected remedy does not require treatment because the treatment alternative considered, stabilization of waste, would achieve only marginal additional protection for more than triple the cost.

E. Preference for Treatment as a Principal Element

As stated above, the selected remedy does not require treatment because the treatment alternative considered, stabilization of waste, would achieve only marginal additional protection for more than the cost.

XII. DOCUMENTATION OF SIGNIFICANT CHANGES

The Proposed Plan identified remedial alternatives to address all aspects of contamination at the Site including buried waste, soils, groundwater, surface water, and sediments. During the public comment period, the Neville Land Company provided information indicating that the contaminated groundwater at the Site may be naturally attenuating and, therefore, not migrating beyond the Site. The Neville Land Company requested an opportunity to collect additional site-specific information to evaluate this possibility further before EPA makes a decision on the appropriate groundwater remedy for the Site. EPA agreed to allow this additional investigation. Although this investigation is being performed on an expedited schedule, EPA did not want to delay a decision on the remedy for the buried waste and contaminated soils at the Site. Therefore, the remedy selected in this ROD addresses the buried waste and contaminated soils consistent with the Proposed Plan, but does not address groundwater. EPA will select the appropriate remedy for groundwater in a subsequent ROD after considering the findings from the additional investigation.

RECORD OF DECISION
OHIO RIVER PARK

PART III - RESPONSIVENESS SUMMARY

Comments raised during the public comment periods on the Proposed Plan for the Ohio River Site are summarized in this Responsiveness Summary. The first comment period was initially held from April 2, 1996 to May 1, 1996 to address the Proposed Plan. Upon request, the public comment period was extended until June 1, 1996.

Oral comments were presented at the Proposed Plan Public Meeting on April 15, 1996. These comments and EPA's responses are presented in Section I of the Responsiveness Summary. During the Proposed Plan Public Meeting, EPA received two written statements; EPA responses to these statements are also presented in Section I. A transcript of the first public meeting has been included in the Administrative Record for the Site.

EPA received five letters from concerned parties on the cleanup alternatives or other aspects of Site activity during the public comment period. Three letters were from local residents concerned about the potential impact of Site-related contamination on their residences. The other two letters were from a volunteer organization of residents and from the Buckeye Pipe Line Company. The comments presented in these letters and EPA's responses are presented in Section II of the Responsiveness Summary. These letters have been included in the Administrative Record for the Site.

Neville Land Company ("NLC") submitted two sets of comments on the Proposed Plan. EPA has reviewed and responded to these comments in Section III of the Responsiveness Summary. These comments have also been included in the Administrative Record for the Site.

During the public comment period, NLC volunteered to start an additional study on groundwater modeling and natural attenuation at the Site. EPA responded to this initiative by postponing a final decision pertaining to the groundwater and groundwater-related contamination until the additional study is completed. Correspondence pertaining to the additional study which was received from the NLC during the public comment period has also been included in the Administrative Record for the Site.

I. ORAL COMMENTS AND WRITTEN STATEMENTS FROM THE APRIL 15, 1996 PUBLIC MEETING

A. Remedial Alternative Preferences

1) Several residents had general questions regarding the construction and design of the cap.

Response: A multilayer cap will be constructed over the areas of concentrated waste. The cap will isolate surface soil and reduce the rate at which precipitation over the waste areas infiltrates the soil and buried waste to reach the groundwater below. The cap also wall reduce the risk of direct exposure to contaminated soil. The cap will be constructed in accordance with procedures that adhere to all applicable Pennsylvania regulations. The details of the cap design will be completed during the remedial design phase of the project.

2) Residents did not understand how vegetation would be able to grow over the cap if contaminated soil is present.

Response: EPA responded that contamination of soil does not automatically prevent plantgrowth. Some plants can actually accumulate high concentrations of contaminants in their cells. In areas of the Site to be capped, however, revegetation will occur in clean soil cover that will be brought to the Site.

3) One resident stated that people grew crops and raised livestock on the Site during and after the period that pollutants were deposited there (the 1930's). He said that people ate the crops and consumed dairy products from the cows raised on the land without adverse health affects. The resident also stated that it appeared that contaminants were not migrating from the Site. Considering these issues, the resident believed that EPA should not be spending millions of dollars to clean up the Site.

Response: The contaminant levels present at the Ohio River Park Site have the potential to pose an unacceptable risk to human health and the environment. EPA is required by law to respond to these contaminant levels, and also to develop long-term solutions for the cleanup for sites such as this one where hazardous substances pose a threat.

4) Residents wanted to know why Alternative 2, which involves capping the waste, was chosen instead of Alternative 4, which calls for removal of the waste from the Site.

Response: EPA considered several criteria during the process of evaluating remedial alternatives for the Ohio River Park Site. Alternative 2 provides the most reasonable balance between the risk posed by this Site and costs required to implement each alternative. The added risks and cost associated with excavating the material and/or transporting it off-site do not provide a corresponding increase in overall effectiveness since the wastes present at the Site can be reliably contained by capping.

5) One resident wanted to know how the cleanup that will be performed at the Ohio River Park Site will differ from the one that will be performed at the Herr's Island Site.

Response: Waste at Herr's Island was excavated and physically removed to another portion of the island where it was consolidated in a lined waste cell and capped. Waste areas at the Ohio River Park Site will be covered in place with a multilayer cap.

6) Residents asked about the anticipated life expectancy of the cap.

Response: Although caps do degrade over time, with proper maintenance they will last for many years. The current property owner and all successive property owners will be responsible for ensuring that the waste areas remain capped and that the cap is properly maintained.

7) A resident was concerned about the durability of the cap and asked if capping was a commonly used technology.

Response: Capping is a common technology which has been in existence for over 30 years. Caps have been used at many Superfund sites and municipal landfills. Additionally, EPA will perform a mandatory review of the remedial system every five years to ensure that it remains protective of human health and the environment.

B. Future Use

8) A resident stated that EPA should consider implementing Alternative 4 if it will lessen restrictions on land use once the cleanup is complete.

Response: Under Alternative 2, future land use will be restricted to prevent residential development or future use of the groundwater. Under Alternative 4 (waste excavation), these same restrictions would apply because only the concentrated wastes present at the Site would be removed. Low level contamination would remain and would be covered with clean soil and revegetated. While less contamination would remain at the Site under Alternative 4, use of the Site for residential purposes would still be prohibited.

9) Several residents had questions regarding the planned future use of the Site for the park.

Response: The property that is occupied by the Ohio River Park Site is owned by the NLC. The future use of the Site will be determined by the Site owners, in compliance with any restrictions or prescriptions (e.g., zoning ordinances or master plans) of the local government. The remedy, required by EPA does include two important restrictions on the future use of the Site. First, the remedy will include deed restrictions to prohibit future installation of groundwater wells. Second, future residential use or any use incompatible with the multilayer cap will be prohibited.

10) A resident asked what the best-case and worst-case scenarios for future use of the Site might be.

Response: In the past, some remediated Superfund Sites have been used as parks, ball fields, and parking lots. Sites also have been used for light industrial purposes (e.g., warehouses, maintenance sheds). The worst-case scenario would probably involve installation of a security fence and "No Trespassing" signs at the Site.

C. Cost/Funding Issues

11) A resident wanted to know why the NLC was not being held responsible for the cleanup.

Response: NLC is a responsible party at the Site and will be sent a Special Notice Letter inviting them to make a good faith offer to perform the Site cleanup and pay for EPA's past costs. EPA's preference is for responsible parties to finance and perform the cleanup of a Superfund site. If the responsible parties do not perform the work willingly, EPA has several enforcement options that would compel them to clean up the site. Alternatively, EPA could perform the cleanup and attempt to recover the costs from responsible parties later.

12) A resident asked what assurance local residents have that a source of funding for the proposed future monitoring will exist.

Response: Following implementation of the selected remedy, EPA will negotiate with the responsible parties to compel implementation of this remedy, including the future monitoring. EPA currently has substantial authority to require potentially responsible parties to conduct necessary cleanup actions. Furthermore, according to Section 104)4(c)(3)(A) of CERCLA, 42 U.S.C § 9604(c)(3)(A), and the NCP at 40 C.F.R. § 300. 510(c)(1), the State must provide assurance up front that it will assure all future maintenance of the remedial action.

13) A resident wanted to know if any consideration was given to tax revenues that could be generated by industrial or residential tenants that may be able to occupy the Site if Alternative 4 was implemented.

Response: As discussed in Question #8 above, future land use at the Site under Alternative 4 would not be significantly different than that allowed under Alternative 2. Even if higher valued use could be made of the Site, tax revenues from potential development are not considered when estimating the cost of Superfund cleanups. EPA only estimates those costs necessary to clean up the Site.

D. Risk to Human Health and the Environment

14) A resident asked what health hazards the Site presents to local residents.

Response: Currently, the greatest hazard presented by the Site is ingestion of contaminated groundwater. Eating fish caught in the river near the Site also poses a health hazard. Less probable causes of risk from the Site include direct contact with contaminated soil and showering with contaminated groundwater.

E. Technical questions

15) A representative of the County Commissioner's Office wanted to know if the use of ozonolysis was considered as an alternative to air stripping.

Response: Ozonolysis is the treatment of water through the use of ozone. Ozone is sometimes used as a disinfectant for municipal applications instead of chlorine. Since the ground water at the Ohio River Park Site will require the removal of volatile organic compounds, not disinfection, ozonolysis was not considered as an alternative to air stripping.

16) A resident wondered if the capture zone of the extraction wells for the pump-and-treat system would affect the capture zone of the Coraopolis well field if the number of Coraopolis wells were to increase.

Response: The extraction well network for the pump-and-treat system could be designed to avoid an impact to the capture zone of the Coraopolis well field. Of greater concern is the potential for the capture zone of the Coraopolis wells to impact the plume of contaminated groundwater at the Site, especially in the event of Coraopolis wells being overproduced.

17) A resident inquired about the effect of flooding on the cap.

Response: The potential for flooding will be taken into consideration during the Remedial Design. If the cap would be damaged in any way during a flood event, repairs would be made as part of the cap maintenance requirements.

18) A resident was unsure what was meant by the stabilization described in Alternative 3.

Response: Stabilization of wastes revolves mixing them with a compound, such as cement, which makes the waste material immobile. The stabilized waste is then placed in a cell which has a geosynthetic liner on the bottom and soil cover on the top.

19) The Township engineer provided a statement suggesting that off-site migration of contaminants may not be occurring and, as a result, groundwater extraction and treatment may not be necessary.

Response: The reformation collected during the Remedial Investigation is insufficient to determine the extent of off-site migration of contaminated groundwater. In the Proposed Plan, EPA identified additional groundwater studies that would be needed to better assess the potential for migration of groundwater contamination. If groundwater contamination was found to be migration off-site, extraction and treatment of the groundwater would be required. During the public comment period, NLC requested an opportunity to collect additional groundwater information before EPA selects a groundwater remedy. EPA agreed to wait for the additional information if the work was completed on an expedited schedule. NLC is currently completing this study and EPA expects to receive a report in September 1996. EPA decided to proceed with issuance of this ROD to address the buried waste and contaminated soil at the Site. EPA will select a remedy for groundwater, surface water, and sediments (OU-3) in a subsequent ROD after review and evaluation of the additional groundwater information.

20) A resident wanted to know if the groundwater treatment facility would be located onsite and if the chosen treatment method would be effective in removing the majority of Site contaminants, such as benzene and toluene. The resident also expressed concerns that the facility would have an unpleasant appearance.

Response: In the event that a groundwater treatment remedy is selected in the ROD for OU-3, the treatment facility, would need to be located onsite. An air stripper would be used to remove volatile contaminants like benzene and toluene. It is possible to design treatment facilities in ways such that their appearance is homogeneous with their surroundings.

21) A resident asked about the size of the aquifer beneath the Site.

Response: The Site monitoring wells and the Coraopolis water supply wells intercept the same coarse-grained sand and gravel aquifer that extends beneath the Ohio River Back Channel. The distance between the edge of the island and the Coraopolis wells is approximately 700 feet. The boundaries of the unconfined surficial aquifer beneath the river have not been determined.

22) A resident wanted to know how many monitoring wells are located at the Site.

Response: There were approximately 27 monitoring wells at the Site used during different phases of Site assessment.

23) A resident inquired whether EPA noticed an increase or decrease in the concentration of benzene and phenolic compounds in groundwater at the Site. The same resident wanted to know whether the plume is extending underneath the river and whether there are any wells in the plume.

Response: The remedial investigation analytical data does not indicate that the concentrations of benzene and phenolic compounds in groundwater at the Site present noticeable changes in time. Because the Site is bordered by the Ohio River, there are no wells in the plume between the Site and Coraopolis wells. The current data pertaining to the concentration of contaminants beneath the river was obtained from Barcad samplers placed in the bed of the Back Channel. Benzene was detected in one round of groundwater samples between the Site and Coraopolis wells, however, it cannot be determined that the presence of this contaminant is Site-related, and there is not enough evidence to evaluate potential movement of the plume. This information will be obtained prior to issuing the ROD for OU-3.

24) The same resident pointed out that dumping of hazardous wastes began at the Site approximately 50 years ago. He stated that it seems logical that if the contaminants were going to reach the Coraopolis well field, they would be there by now. He also stated that he is employed by an environmental laboratory that has analyzed water from the Coraopolis wells, and there is no evidence of Site contaminants in the water.

Response: While much of the groundwater at the Site is expected to discharge to the river, the potential for some migration beneath the river may exist. The remedial investigation did not provide sufficient information to conclusively state that contaminated groundwater from the Site cannot reach the Coraopolis wells. Although the aquifer that underlies the Ohio River Park Site may not be used on Neville Island at the present time, it is used as a drinking water source throughout the Ohio River Valley. Allegheny County Health Department reports identifying drinking water protection areas indicate a potential for Coraopolis wells to be contaminated by the Site. This potential could be increased by overproduction of Coraopolis wells. The additional studies currently being conducted by the NLC are expected to provide a better understanding of groundwater flow at the Site. Therefore, this ROD does not include a decision on the appropriate groundwater remedy for the Site.

25) A citizen inquired about what analyses would be performed at the Coraopolis wells during the long-term monitoring.

Response: The details of the long-term monitoring plan will be determined during the remedial design However, EPA expects that samples collected from the Coraopolis wells as part of the long-term monitoring program will be analyzed for volatile organic compounds, semi-volatile organic compounds, and selected metals.

26) The same resident requested that monitoring of the Coraopolis well fields be performed monthly rather than quarterly during the construction phase of remediation. He believed that construction activities may cause contaminants to migrate to water more readily.

Response: Since the required remedial action will not consist of major excavation activities which would disturb the buried waste, a more frequent sampling schedule such as the requested monthly sampling at Coraopolis would not be beneficial. Quarterly sampling should be adequate in evaluating any impact from the Site to the Coraopolis well field. If contamination at the Coraopolis wells is detected and suspected to be originating from the Site the frequency of groundwater monitoring can be increased as necessary. The details and schedule of remedial action sampling will be determined during the remedial design phase of the project.

27) Another resident stated that the most hazardous chemicals found at the Site, specifically 2,4-D, benzene, and hexachloride, were not dumped at the Site until after World War II.

Response: EPA acknowledged this information.

28) A citizen asked how many extraction wells would be needed for the pump-and-treat system.

Response: Additional groundwater information would be required to determine the appropriate number of wells needed to extract the contaminated groundwater. This information would normally be collected during the design phase of the remedy. Information currently being collected by the NLC may assist in this determination if a pump-and-treat system is required. This decision will be made in the subsequent OU-3 ROD.

29) A citizen asked what percentage of the Site the cap will cover.

Response: Although the exact dimensions of the multilayer cap will not be finalized until the Remedial Design has been completed, Figure 2 in the ROD identifies the general areas that EPA expects to be covered by the multilayer cap.

30) A resident asked how many samples have been collected from the Coraopolis wells to date.

Response: One well from the Coraopolis well field was sampled twice during the Remedial Investigation.

31) One resident asked if the pesticide parathion had been detected at the Site.

Response: The results of the analyses of Site soil, groundwater, surface water, and sediment do not indicate the presence of parathion.

32) A resident asked which wells from the Coraopolis well field were sampled during the Remedial Investigation.

Response: The Remedial Investigation included sampling from Coraopolis well #2.

F. Written statements

33) Bill Nickles, the Chairman of Neville Township Board of Commissioners appealed to EPA to represent "significant flexibility to allow for the best future development" of the Site. Mr. Nickles mentioned that by opening a new bridge linking the Neville Island with Coraopolis, and utilizing "the future potential of this property" (the Site), the Township could attract new businesses and increase its tax base. The Township fully supports NLC's study hoping that "money not spent on clean up can be spent instead to create a more valuable development of the Township".

Response: Since the beginning of this project, EPA has been very concerned about the economical development and recreational needs of Neville Island residents. EPA's decision to create a separate operable unit (OU-2) for the Bridge Portion of the Site allowed for timely construction of a new bridge, which conveniently connected the island with Coraopolis. EPA has demonstrated flexibility by allowing NLC to continue its additional groundwater attenuation study, before EPA makes a decision on the appropriate groundwater remedy for the Site. At the same time, EPA is issuing this ROD in order to move forward with the necessary actions to address the buried waste and contaminated soil at the Site. ROD allows cleanup to proceed so that future use of the Site is not delay while evaluation of the groundwater conditions at the Site continues. While residential use of the Site is not permitted under the ROD, commercial, industrial, and/or recreational use is possible provided that adequate precautions are taken to protect the integrity of the multilayer cap.

34) Dr. James E Barric, P.E., Neville Township Engineer presented his opinion that Alternatives 3 and 4 are "prohibitively expensive and would not effectively remove the contamination plume that has been detected." For this reason, he supports capping as "a viable and effective approach to remediation". Dr. Barric also supports the NLC's study and believes that "accurate hydrogeologic modeling" can replace current conservative assumptions and allow the responsible parties to direct "resources required for extraction and treatment" to "development and productive use of the site".

Response: EPA's own analysis of the remedial alternatives agrees with Dr. Barric's, and EPA has chosen, Alternative 2, the multilayer cap. EPA, the Commonwealth, and the NLC have been working cooperatively to ensure that the additional groundwater study will present reliable data on the current and potential migration of the contaminated plume. Following EPA's review of the NLC study, EPA will decide on the appropriate remedial action pertaining to the groundwater contamination at the Site. Future use of the Site and the type of development that the Neville Island community wants for the area is an important factor that EPA has considered in this ROD and will consider in deciding an appropriate groundwater remedy in the OU-3 ROD.

II. WRITTEN COMMENTS RECEIVED DURING THE PUBLIC COMMENT PERIOD

A. Comments from General Public

1) A volunteer organization of Neville Island residents opposed alternatives presented by EPA which required excavation contaminants or capping, and supported natural attenuation as the best way to return Site to its recreational uses.

Response: Biological degradation of Site contaminants in the buried waste and soils at the Site would require an extended period of time. Particularly, PAHs and toxic metals in the soil require an especially long time to be naturally remediated or may not be naturally remediated at all. Many of the wastes present at the Site were disposed of fifty years ago, yet they still contain contaminants at levels of concern. EPA has agreed to allow the NLC the opportunity to evaluate the possibility of natural attenuation occurring with contaminants in the groundwater at the Site. However, EPA is requiring that multilayer and erosion caps be placed over the buried waste and contaminated soil to prevent individuals from being potentially exposed to the contaminants present in these materials.

2) A resident expressed concern that the multilayer cap and groundwater extraction and treatment proposed as EPA's Preferred Alternative in the Proposed Plan would not be sufficiently reliable. This person was also concerned that groundwater from the Site may contaminate Coraopolis wells, and, therefore, proposed that EPA would test fish for contamination, and reconsider Alternative 4.

Response: Multilayer caps, by virtue of combining different types of natural and synthetic materials in their construction, are less vulnerable to damage or degradation than caps which are of homogeneous construction. For this reason multilayer caps are often used to cover and protect hazardous waste sites and disposal areas. Since the toxic materials at the Site are not concentrated in any one area, excavation of all the contaminated areas would be difficult, and would be several times more expensive than capping. The construction of a multilayer cap provides a practical and effective means of isolating contamination from human contact. A properly designed multilayer cap is highly durable and should continue to protect people from contact with residual contamination into the distant future. The permeability of a multilayer cap is low, therefore, the cap will greatly reduce the rate of infiltration and help control the migration of contaminated groundwater. The NLC is conducting additional field investigations and groundwater flow modeling to better evaluate the potential for offsite migration. Currently, EPA does not have plans to conduct any additional analysis of fish since the additional groundwater studies should provide better information for evaluating contaminant migration from the Site.

3) Buckeye Pipeline Company expressed concern pertaining to the cost of eventual relocation its pipeline, and, in the event the pipeline is allowed to remain at the Site, requested an opportunity to have input on the design of the cap and the need for access to the pipeline during maintenance and emergencies.

Response: EPA does not anticipate that the pipeline will need to be relocated to construct the multilayer cap. EPA roll coordinate with Buckeye Pipeline Company on the design and access issues during the remedial design process.

4) A resident expressed concern that Alternative 4 should include relocation of residents during remedial work, and the selection of an alternative should be based on the duplication of testing results by an independent firm.

Response: Under Alternative 4, all necessary precautions would be taken to ensure that the buried waste would be excavated and transported off-site in a safe manner. Contingency plans would be developed to address any potential spills which could occur. Temporary relocation of nearby residents would not be necessary to ensure safety under Alternative 4. EPA has, however, selected Alternative 2 which does not require any excavation or off-site transportation of buried waste. During the remedial investigation at the Site, EPA collected an danalyzeed in EPA's approved laboratories duplicate samples ("split samples") to assure the quality of the data generated by the NLC. The same procedure took place during the additional groundwater study which followed the Proposed Plan. Therefore, further testing to duplicate the results is not necessary.

5) A resident asked why EPA has not started cleaning up the Site and suggested combining Alternatives 2,3, and 4 into one alternative.

Response: After EPA has identified its preferred cleanup alternative based on a completed RI/FS, EPA is required to solicit public comment on its plan prior to finalizing the remedy selection. This ROD now completes that process and EPA can proceed with the final stages of designing a permanent remedial solution for this Site. The process has at times seemed long; however, the objective has been to evaluate thoroughly all the sources of risk to human health and the environment, and then to select an optimal alternative. Combining alternatives would not be feasible or cost-effective: Alternatives 3 and 4 cannot be combined because stabilizing the contaminated soil prior to off-site disposal would result in significant materials handling and transportation problems. Alternatives 2 and 4 cannot be combined, because they are mutually exclusive. Either the waste is capped in place (Alternative 2) or it is excavated and transported off-site (Alternative 4).

B. Written comments received from Neville Land Company

The comments from NLC were received in two transmissions. Below, EPA responds to he comments from the March 14, 1996 letter.

1. Footnote 1 is inconsistent with the spirit of NLC's agreement with EPA resolving a dispute over the acceptability of the Ecological Risk Assessment ("ERA"). This footnote should be modified to state that the administrative record contains the full draft ecological risk assessment, which sets forth additional data on the extent to which the Site may pose risks to fish and wildlife.

Response: The footnote is consistent with the EPA's position expressed in a letter to NLC, dated November 18, 1994. This letter concludes the dispute resolution on the ERA by stating that NLC acknowledges that it remains EPA's position that the draft ERA was not fully prepared in accordance with the terms of the AOC in this matter, that only sections 1.0 - 3.0 thereof have been formally approved by EPA, and that EPA's data interpretation along sections 1.0 - 3.0 of the draft ERA together constitute the EPA approved ERA for the Ohio River Park Site. Footnote 1, therefore, is written in accordance to the resolution ending the dispute between the two parties.

2. The Proposed Plan should state that the Buckeye Pipeline easement is located both on NLC land and the County's land.

Response: Correction was made in the ROD.

3. The Proposed Plan should note that EPA determined after completion of an RI/FS for OU-2 that "No Action" was the appropriate response for this portion of the Site.

Response: Information regarding the results of the OU-2 RI/FS and the subsequent "No Action" ROD was added to the ROD.

4. There is no evidence that agricultural chemical wastes were disposed of in the waste trenches

Response: The RI Report on page 1-5 presents the information on agricultural chemical production and states that one container of waste pesticide was discovered at the Site in the early 1980's. This discovery suggests that pesticide-containing wastes were intentionally disposed in some trenches. Furthermore, contamination by trichlorophenol, a raw material in the manufacture of pesticides, is well documented. One instance of bulk disposal of 2,4-D was also documented. Section 10.1.2 of the RI Report adds that "information gathered from interviews [indicated] that agricultural chemical disposal was infrequent, random and involved relatively small quantities." Therefore, the characterization of the pattern of disposal activities as resulting in the disposal of "occasional agricultural chemical wastes" appears warranted by the data.

5. This statement regarding transfer of the Buckeye Pipeline easement is misleading. See comment 2, above.

Response: Clarification was made in the ROD.

6. The Proposed Plan should clarify that EPA prepared the baseline human risk assessment for the Site and that the baseline human risk assessment has been modified by EPA since the January 1995 issuance date cited above.

Response: This information is included in the Administrative Record for the Site, but was not deemed necessary, for inclusion in the Proposed Plan.

7. PCBs should not be discussed in the Proposed Plan because the RI documents that PCBs do not appear to be constituents of concern in surface soils at the Site.

Response: EPA typically includes a list of contaminants encountered in the course of an investigation, without regard to whether a particular contaminant is a primary source of human health risk. PCBs were selected in the baseline risk assessment as contaminants concern in the surface soil media.

8. The Proposed Plan incorrectly indicates that the highest concentration of PAHs in the subsurface soft is 22 ppm. The RI, pages 5-18 and 5-19 and Table 5-4, indicates the highest concentration of PAH detected in subsurface soil was Naphthalene in boring NB-44-5 at 17 ppb.

Response: The PAH concentration of 22 ppm originally included in the Proposed Plan was incorrect. However, the correct concentration of total PAHs was actually 38 ppm as indicated in Figure 5-7 of the RI Report. The Proposed Plan was corrected to include this information.

9. The Proposed Plan states that an estimated value of 0.024 ppb was reported for the pesticide gamma-chlordane in only one of the eleven surface water samples collected adjacent to the Site. The Proposed Plan should also state the conclusion reached in the RI on Site surface water quality (page 6-8): "In summary, surface water quality adjacent and downstream of the [Site] is similar to surface water quality upstream of the [Site]."

Response: This section of the Proposed Plan provides a brief summary of the data collected during the RI. EPA's interpretation of the data is summarized in the section summarizing Site risks.

10. The Proposed Plan implies that contamination in sediment samples originates from the Site. However, the contamination of riverbed sediments cannot be specifically attributed to releases from the Site.

Response: The Proposed Plan acknowledges that similar contaminant concentrations were found upstream as well as downstream of the Site. While there are likely to be multiple sources contributing to the sediment contamination in the river, the samples collected in the vicinity of the Site did exhibit elevated concentrations of contaminants that have been found at the Site.

11. This DNAPL analysis in the Proposed Plan neglects the co-solubility effect of benzene also found in groundwater at this location. Trichlorophenol exhibits several orders of magnitude greater solubility in benzene than in pure water. Within the normal Site groundwater temperature range of 10-15 degrees Celsius, the pure condensed phase of trichlorophenol is a solid, as to the condensed phase of most other phenolic compounds.

Response: The RI does not provide sufficient information to evaluate the co-solubility effect of benzene on trichlorophenol. Additional information currently being collected by NLC may provide further clarification as to the presence of DNAPL at the Site. Trichlrophenol is moderately soluble in water (solubility equals 900 ppm or 0.09 percent). Observed concentrations of trichlorophenol are plausibly related to dissolution of pure phase accumulations which are localized in the shallow subsurface; probably in the near vicinity of wells NERT-20, 27 & 41.

12. The Proposed Plan states that a small percentage of the groundwater (approximately 2%) may flow beneath the river and could potentially reach the Coraopolis Borough water supply wells. The groundwater modeling reported in Section 9.8 of the RI Report showed that the capture zone of the Coraopolis water supply wells extends no further toward the western end of Neville Island than approximately midway across the back channel of the Ohio River. To NLC's knowledge, there are currently no other analyses in the Admininstrative Record that suggest a more extensive capture zone. If such analyses exist and have been used by EPA in the development of this Proposed Plan, NLC requests an opportunity to evaluate them.

Response: EPA based the above statement in the Proposed Plan on Table 9-10 (page 9-72) of the RI Report which estimates the mean flow rate of water leaving the sand/gravel aquifer beneath the Site and flowing under the Ohio River to be <2 %. EPA recognizes that this estimate is based on conservative assumptions. The issue of the potential impact of the Site on the Coraopolis well field can be evaluated more fully upon completion of NLCs additional groundwater study which includes further field investigation and groundwater flow modeling.

13. The Proposed Plan states that EPA can take action where the human health carcinogenic risk is within the range between 1.0E-04 and 1.0E-06. The BLRA states (page 3) that the acceptable Superfund risk level is 1E-04 for carcinogens. While EPA may take action where the risk is below the statutory acceptable limit of 1E-04, such action should be predicated on a site-specific assessment of risks, costs, and benefits.

Response: Section 300.430(e)(2)(i)(A)(2) of the NCP states that "for known or suspected carcinogens, acceptable exposure levels are generally concentration levels that represent an excess upper bound lifetime cancer risk to an individual of between 10-4 (i.e., 1.0E-04) and 10-6 (i.e., 1.0E-06) using information on the relationship between dose and response. The 10-6 risk level shall be used as the point of departure for determining remediation goals for alternatives when ARARs are not available or are not sufficiently protective because of the presence of multiple contaminants at a site or multiple pathways of exposure". All of the exposure scenarios presented in the Proposed Plan (Table 1) and this ROD (Table 10) exceed the 10-6 risk level set as the point of departure for remediation goals. Six of eight exposure scenarios exceed the 10-4 risk level and a outside of the acceptable risk range. Therefore, action is warranted at this Site.

14. The Proposed Plan identifies eating fish from the river as an exposure route included in the risk assessment. Contamination of fish taken from the Ohio River cannot be

attributed to the Site.

Response: Contaminants in sediments and surface water include 11 contaminants of concern associated with the Site. EPA acknowledges that this industrialized reach of the Ohio River has many potential sources of contamination and that, in general, surface water quality, adjacent and downstream of the Site is similar to surface water quality upstream of the Site. However, the fact remains that the Site is a contributor to contamination of the river and its sediments. In the BLRA, eating fish was an appropriate pathway to include in several exposure scenarios. In the absence of fish tissue analyses, conservative assumptions were incorporated which pertain to the potential for bioconcentration of contaminants in fish.

15. This risk table (Table 1) in the Proposed Plan presents a distorted view of the current and future risk for the Site. Almost the entire human health risk associated with exposure to Site contaminants is attributable to the use of Site groundwater. There is presently no direct use of Site groundwater for drinking, bathing, or showering purposes. All Neville Island consumers are supplied water from off-site water authorities, as are all off-site consumers. This fact needs to be stated in the Proposed Plan.

Response: The Proposed Plan explains that the exposure scenarios include a range of possible future Site conditions and uses, without regard to present restrictions on land use. BLRA followed EPA guidance to develop exposure scenarios which are appropriate for the evaluation of potential remedial actions. The approach is inherently conservative to be protective of human health and to account for uncertainties in Site information.

16. The lifetime cancer risk attributable to fish consumption in the BLRA is based on a calculation of bioconcentration of contaminants in fish, and further on only one detection (at an estimated level) of the pesticide gamma-chlordane in surface water during the RI. There has been no demonstration that fish in the Ohio River surrounding the Site are contaminated with gamma-chlordane to the levels assumed in the BLRA, or that the Ohio River has been contaminated by releases from the Site.

Response: Gamma-chlordane has been identified as a contaminant of concern at the Site and was detected in a surface water sample during the RI. Since this contaminant is known to bioconcentrate in fish, EPA made the conservative assumption that the contaminant could be present in fish which are consumed from the river. EPA guidelines for the screening of contaminants of concern and estimation of exposures risks are intentionally conservative to be protective of human health and to account for uncertainties Site information.

17. Excluding the risk calculated for consumption of contaminated fish, the BLRA results show that risks to off-site residents consuming untreated river water, and to recreational Site users, are both below the statutory limits for Sites. These facts need to be stated in the Proposed Plan.

Response: Consumption of fish is an appropriate exposure pathway to use for this Site. The potential carcinogenic risk to off-site residents and Site recreational users exceeds 1.0E-06, the statutory point of departure for remediation goals at Superfund sites, whether or not the fish consumption exposure pathway is included in these scenarios.

18. Excluding the risk calculated for consumption of contaminated fish, the BLRA cancer risks for on-site residents utilizing a public water supply are below the statutory limit for Superfund sites. This fact needs to be stated in the Proposed Plan.

Response: See response to comment #17 above.

19. The risk levels computed for off-site residents using groundwater taken from the Site are based on assumed ingestion of contaminated fish and use of groundwater with contaminants at the concentrations found in well 6D (river well near the Site). Excluding the risk calculated for consumption of contaminated fish, the BLRA cancer risk for this scenario is below the statutory limit for Superfund sites. The hazard index for this scenario is driven by elevated manganese concentrations detected in well 6D. Elevated manganese concentrations are potential indicators of anaerobic digestion of petroleum hydrocarbons.

Response: See response to comment #17 above concerning the fish consumption issue. Contaminant concentrations in well 6D were considered to represent reasonable maximum exposure point concentrations appropriate for use in the risk calculation. In addition, manganese was identified as a contaminant of concern at the Site using standarized screening criteria. No systematic investigation has been conducted at the Site to establish that the Site is not a source of manganese in groundwater. Furthermore, if elevated manganese concentrations are the result of intrinsic biodegradation processes, Site-related wastes could still be responsible for this manganese increase.

20. The ERA concluded that any potential ecological risk from the Site would be in the low to moderate range. No demonstration of actual harm to organisms or habitats adjacent to or downstream of the Site as a result of releases of contaminants from the Site has been made. Acknowledgment of the differing assessments should be made.

Response: Actual harm to the environment does not have to be documented to establish that the potential for significant adverse impacts exists. Based on the contaminant concentrations found in the surface water and sediment at the Site, the potential for adverse impact exists. The conclusions presented in the draft ERA were not accepted as part of the EPA-approved Ecological Risk Assessment for the Site. See comment #1 in this section above.

21. The Proposed Plan states that given the level of contamination in surface water and sediment, contaminants from the Site are suspected to have contributed to degradation of the river. This is an overstatement. There is no evidence that the Site is contributing to the "degradation of the Ohio River.

Response: The RI Report concludes that most, if not all, unattenuated contaminants from the Site which are migrating with groundwater will discharge to the Ohio River. In addition, the potential for the erosion of contaminated sediments during flood events is undisputed. Contaminants in sediments and surface water include 11 contaminants of concern which are related to the Site. EPA acknowledges that many sources have ultimately contributed to degradation of the Ohio River. However, the presence of other sources does not justify discounting contributions from this Site to the river's overall degradation.

22. It remains NLC's understanding that a cap designed to isolate the areas where wastes are buried would be acceptable to EPA and PADEP if it achieved the permeability performance standard required of multilayer caps described in the relevant portions of the PA Residual Waste Management Regulations.

Response: The details of the design of the multilayer cap will be developed and approved by EPA and PADEP during the remedial design phase of the Site cleanup. The performance standards for the multilayer cap have been established in Section X (Selected Remedy and Performance Standards) of the ROD.

23. NLC intends to properly abandon the on-site oil well in accordance with Pennsylvania Oil and Gas Well Regulations. The well is unlikely to threaten the integrity of the

multilayer cap to be placed over waste trench areas. Hence, linking its abandonment to a requirement to ensure the integrity of the cap is unnecessary.

Response: Depending upon the design of the cap, the presence of the well may interfere with the construction of the cap and, therefore, may detrimentally affect the cap's performance. Also, the oil well construction may act as a conduit for further migration of groundwater contamination. EPA has included abandonment of this well as part of the remedy selected in this ROD.

24. The manner in which the cap design will address the presence of the on-site oil pipeline should be determined during remedial design.

Response: EPA agrees.

25. Materials to be covered by the cap are not expected to generate any substantial quantity of gas. The need for the gas ventilation system component of the remedy should be determined during the remedial design.

Response: The two sources of "gas" generation which are relevant to the design of a cap are: 1) carbon dioxide, nitrogen, hydrogen sulfide, or methane gas generated as a by-product of the biodegradation of organic matter or organic contaminants; and 2) pore air displaced by episodes of rising water table. EPA anticipates that vents will have to be designed to allow the escape of air which would otherwise be trapped below a low permeability cap during flood events. Without the installation of vents, the cap may be severely distorted and permanently damaged by flooding events. EPA can waive the requirement for a gas vent system during the remedial design if the following requirements are met:

1. Field measurements are conducted which convincingly demonstrate that the rate of gas generation by biological activity will not require passive venting; and

2. Engineering calculations are presented that show how the cap system will accommodate the pressures associated with the displacement of pore air trapped between the rising water table and the cap.

26. NLC requested a meeting with EPA to discuss the viability of intrinsic remediation as a component of the groundwater remedy at the Site. Groundwater sampling was performed on March 10 and 11, 1996 to obtain current data on Site conditions which could serve as indicators of the existence and effectiveness of natural attenuation processes.

Response: EPA agreed to allow NLC the opportunity to provide additional groundwater data for the Site to better evaluate the hydrogeologic conditions and the potential natural attentuation of groundwater contamination. NLC will submit a supplemental hydrogeologic study report for EPA's consideration, which will include results of field investigations and additional groundwater flow modeling. A decision on the appropriate groundwater remedy for the Site will be documented in a subsequent ROD for this Site.

27. A limited-term monitoring program will provide sufficient data with which to evaluate local and regional groundwater flow.

Response: See response to comment #26 above.

28. DNAPL are unlikely to exist within the Site water-bearing zone.

Response: See response to comment #1 in NLC letter, dated May 30, 1996.

29. It was earlier recognized by EPA that sampling of river sediments and Ohio River surface water in the vicinity of the Site would disclose nothing about the Site's condition because of its hydrogeologic setting. Sediment sampling should not be required.

Response: EPA has acknowledged that many sources likely contribute contamination to the Ohio River, however, sediment samples in the vicinity of the Site continue to be the best mechanism for determining possible contaminant contribution from the Site. EPA has no record or recollection of stating that such samples would not be useful in further characterizing conditions at the Site. Therefore, on-going monitoring of river sediments is required as part of the monitoring program for the Site.

30. The requirement for erection of warning signs along the boundaries of the Site is unjustified, given the lack of evidence that the Site is contributing to fish contamination in the Ohio River.

Response: Unless additional data is collected which can show that the Site is not effecting fish (eg., fish tissue analysis) then this requirement will stand.

31. The natural attenuation of benzene and phenolic compounds is not necessarily a slow process. Table 11-1 of the RI documents the longest observed physical degradation half-lives of the most significant Site contaminants. This table indicates that benzene exhibits a degradation half-life of two years and 2,4,6-Trichlorophenol a degradation half-life of five years in groundwater. The RI also indicates that phenols may degrade within a matter of days in certain groundwater conditions.

Response:EPA has provided NLC with the opportunity to document whether natural attenuation is occurring at the Site. NLC will submit a supplemental hydrogeologic study report for EPA consideration, which will include results of additional field investigation and groundwater flow modeling. After evaluating this additional information, EPA wall make a final decision on the appropriate groundwater remedy for the Site in a subsequent ROD.

32. No adverse ecological impacts have been demonstrated at the Site.

Response: See responses to comments #14, #20, and #21 above.

33. Migration of groundwater contaminants away from the Site can also be prevented by natural attenuation processes acting in the water-bearing zone.

Response: See response to #31 above.

34. Mechanical means for achieving an inward hydraulic gradient will not be required if natural attenuation processes are shown to contain the groundwater contamination plume under normal site groundwater flow patterns.

Response: See response to #31 above.

Below, EPA responds to the comments from NLC and Wilmington Securities from the May 30, 1996 letter

1) Dense Non-Aqueous Phase Liquids (DNAPLs), The Proposed Plan asserts (page 6) that the detection of 2,4,6-trichlorophenol at concentrations exceeding 10% of its pure phase solubility in water at one location of the Site "suggests a strong likelihood" that DNAPLs may be present within the Site water-bearing zone. In response to NLC's request, Dames & Moore evaluated the available evidence in the Site record following the protocols

recommended in the document DNAPL Site Evaluation (EPA/600/R-93/022). Dames & Moore's evaluation concludes that 2,4,6-trichlorophenol is not present as a dense, separated phase liquid in the Site water-bearing zone, primarily for the following reasons:

- Over a 15 year history of Site sampling, separated phase liquids have never been observed in soil or groundwater samples collected at the Site; and

- 2,4,6-trichlorophenol is a crystalline solid within the ambient temperature range measured in the Site water-bearing zone.

NLC and Wilmington Securities believe that the weight of evidence presented in the Site record, including the EPA-approved RI, and in the evaluation attached and submitted hereby, eliminate the need for additional investigations to determine whether DNAPL might be present on the Site. NLC does not believe it is cost effective to continually search for something when the available evidence indicates it is not present. Such an investigation would clearly not be an effective use of time nor of scarce remediation fund.

Response: EPA agrees that 2,4,6-trichlorophenol, as well as phenol and many phenol derivatives, will not occur as the pure liquid phase at the ambient temperatures encountered in the subsurface. Rather these compounds will occur as solids. Technically, therefore, these pure compounds are not dense non-aqueous phase liquids (DNAPLs). Trichlorophenol and dichlorophenol are contaminants of this type which were observed at high concentrations in groundwater recovered from wells NERT-20. NERT-27, NERT-41, and soil borings NB-42, NB-44, & NB-46. The high concentrations are strongly suggestive that a pure (or nearly pure) phase source exists for these contaminants.

If disposed as a solid, trichlorophenol might occur as granules or as a resinous mass (e.g., containerized in the shallow subsurface. It is also possible that it was disposed in solution with a non-aqueous solvent, such as benzene. Trichlorophenol contamination is associated with benzene in wells NERT-20, 27 & 41 and at borings NB-42, 44, and 46. However, where trichlorophenol was observed at concentrations exceeding 20% of its solubility in water, benzene concentrations in these same wells did not exceed 2% of its water solubility. Therefore, the association of these chemicals may be coincidental. Nonetheless, without further Site investigation, the possibility cannot be ruled out that at least some trichlorophenol was at one time present as a mixture with benzene. In a concentrated solution, the density of the mixture may have been greater than water. In this form, the solution could have migrated as a true DNAPL.

If present in solution benzene, trichlorophenol could occur in flowable pools of non-aqueous phase liquid (NAPL), either above or below (in the special case of a DNAPL mixture) the water table. Alternatively, it may be widely disseminated as droplets or films. Even as a stationary source of contamination (e.g., solid phase or NAPL trichlorophenol), trichlorophenol may continue to pose a risk for an indefinite time period.

Insufficient data is available to establish the nature of the source of trichlorophenol. Therefore, it may be present as a solid in the shallow subsurface or in a NAPL mixture (or both). Data from soil borings NB-42, 46 & 48 are not useful in distinguishing between these alternatives. Trichlorophenol was reported in these borings at concentrations ranging up to 8,100 ug/kg. The equivalent concentration of trichlorophenol in pore water (30 ppm) is consistent with concentrations observed in groundwater in this area of the Site. Therefore, it is likely that the analysis detected trichlorophenol which was dissolved in groundwater occupying the pore space of the sample. No effort was made to determine the presence of DNAPL in these samples.

The presence and spatial distribution of DNAPL has been inferred at many contaminated industrial sites without direct observation of the DNAPL. Previously collected groundwater and soil data, along with data currently being collected for the supplemental intrinsic remediation could be used to assess the potential presence and distribution of DNAPL at the Site. In order to better document the potential presence (or absence) of DNAPL, EPA recommends that, where possible, NLC employ techniques described in An Integrated Approach For Assessing The Potential Presence And Distribution Of DNAPLs At A Superfund Site In New Jersey (Watkins et al.). Empirical, analytical (utilizing standard equilibria and partition coefficient equations), observational, and anecdotal techniques were applied to an existing database at the CIBA-GEIGY Superfund site in Toms River, New Jersey.

Whether present as solid or in NAPL, the moderate solubility of trichlorophenol in water has resulted in the generation of a prominent contaminant plume. A condensed phase or NAPL source for the plume must lie somewhere in the vicinity of wells NERT-20, 27, & 41. The highest concentrations have been observed at depths of between 25 and 47 feet.

It is possible that a source for trichlorophenol, which was originally located in the shallow subsurface, has been removed during previous Site activities. In tins case, the observed plume may be the residue of this source which is currently migrating downward into the aquifer. However, the existing data cannot rule out the continued presence of a source. Additional drilling and subsurface sampling necessary during the remedial design process to determine the dimensions of the RCRA cap should incorporate methods to distinguish the presence of solid or NAPL containing trichlorophenol.

Regardless of the source of the trichlorophenol, construction of the multilayer cap required in the ROD will reduce the rate of percolation through the buried waste and contaminated soil and into the groundwater. The need for further remedial action for the groundwater will be determined following review of the additional groundwater studies being performed by NLC.

2) Need for Groundwater Extraction and Treatment. In the Summary of Alternatives section of the Proposed Plan (page 11), EPA describes the general characteristics of a groundwater extraction and treatment system which is proposed as an element of the Preferred Remedy for the Site, denoted Alternative 2. By letter dated March 27, 1996, Dames & Moore submitted its evaluation of the results of a geochemical sampling program performed at the Site on March 10 and 11, 1996, to determine whether active bioremediation of groundwater contaminants was occurring at the Site. At NLC's request, the data obtained from this sampling program was also independently evaluated by Dr. James Mercer of GeoTrans, Inc., a recognized expert in the field of intrinsic remediation. Both Dames & Moore and Dr. Mercer concluded that intrinsic remediation of the major contaminant groundwater plume (benzene plume) has been occurring and continues to occur, and that the measured geochemical parameters of the Site water-bearing zone are characteristic of those which can support an effective intrinsic remediation process.

NLC submitted a Work Plan dated April, 6, 1996, for an expanded intrinsic remediation study. The Work Plan describes a detailed program (including extensive Site investigation and detailed flow and fate and transport modeling of the ORS water-bearing zone and connected aquifers) to confirm the extent to which natural processes are containing and reducing the size of the groundwater contaminant plume beneath the southeastern portion of the Site, and to further document that there is no threat to the Coraopolis municipal well field.

NLC and Wilmington Securities requested that EPA fully consider the finding of the proposed Site Intrinsic Remediation Study before coming to a final decision on the Preferred Remedy for the Site.

Response: EPA has agreed to review results of NLC's supplemental hydrogeologic study which is currently in progress and includes field investigations and additional groundwater flow modeling. The purpose of this study will be to more fully investigate the processes of groundwater transport and intrinsic remediation at the Site. Following review and evaluation of this additional information, EPA will identify its preferred alternative for remediating groundwater, surface water, and sediment at the Site and, following an opportunity for public comment, issue a subsequent ROD for OU-3.

3) The value of the December 1, 1995 Wellhead Protection Program Report prepared by Moody and Associates ("Moody report") is limited because, unlike the focused hydrogeologic modeling effort reported in the RI, it was designed to provide merely a general overview of the potential for contamination of drinking water supplies for a series of well fields located throughout Allegheny County.

   The flow model used for the Moody report is a single layer (two-dimensional) model similar in design to the (two-dimensional) FLOWPATH model used to develop information reported in Chapter 9 of the ORS Remedial Investigation (RI) Report. It appears that the major assumptions of both modeling efforts were reasonably similar, with the exception of the assumed value of hydraulic conductivity used in each of the analyses. In addition, the FLOWPATH model was predicated upon the assumptions that time and distance are relevant factors to determine "risk", while the Moody report assumes nothing with respect to time and distance and does not endeavor to assess "risk".

Response: Weakness and limitations exist in the models used in both the Moody report and the RI in terms of predicting the fate of contaminants in groundwater. The supplemental hydrogeologic report to be submitted by NLC will include results of additional field investigations and groundwater flow modeling using a properly validated and calibrated, multilayer, three-dimensional model which should help resolve remaining uncertainties about the fate of Site contaminants.

4) The Moody report identifies over 30 potential sources of well water contamination for Coraopolis, all located much nearer to the municipal well field than the Site.

Response: The existence of other potential sources of contamination does not eliminate the potential impact of the Site on the Coraopolis well field. To date, the Coraopolis wells have not been significantly affected by contamination from any potential source. The objective of the supplemental groundwater studies is to gain a more accurate understanding of the potential future impact of the Site on groundwater in the area.

5) Initial sampling of the Coraopolis sentinel well documented in the Moody report (performed on June 21, 1995) indicated that no volatile compound was found to be present above detection limits. Review of historical sampling records maintained by the Coraopolis Municipal Water Authority also confirms that no volatile compounds (including benzene and other potential Site-related contaminants) have been detected in the Coraopolis production wells during the past several years. These results provide the

best current evidence that the Coraopolis well field is not being affected by the Site and is of a quality which meets all maximum contaminant level criteria.

EPA's Proposed Plan (page 11) suggests the need for NLC to obtain additional information to better characterize the nature of groundwater flow beneath the Site and in the surrounding region. A major element of the proposed Site Intrinsic Remediation Study is the development, calibration, and exercise of groundwater flow and fate and transport models for the Site and surrounding regions (including the Coraopolis municipal well field). As part of the modeling effort, a revised value of hydraulic conductivity for the region being modeled will be determined and applied using the best available data for the local hydrogeologic regime and the results of testing being performed at the Site. The groundwater flow model is being structured as a 3 or 4 layer (i.e., three-dimensional) model. When appropriately validated, the model will be capable of accurately simulating groundwater flow specifically within the ORS/Coraopolis region.

Response: The "best current evidence" pertaining to existing contamination of the Coraopolis well field consists of the validated analytical results from Well #2 which are included in the RI. This sample shows elevated concentrations of five contaminants which are associated with the Site. Water quality data available from the purveyor which has not undergone similar quality control cannot be regarded as being equally reliable.

The Site cannot be ruled out as a contributor to the low-level contamination observed at Well #2 without more detailed information about the fate of contaminants which are presently migrating beneath the back channel of the Ohio River. As stated in the response to comment #3 above, the modeling being performed as part of NLC's additional groundwater studies should help resolve remaining uncertainties about the fate of the contaminants.

6) Design of Multilayer Cap. Any approved multilayer cap should allow for reasonable future Site development, principally by permitting the use of a low permeability cap design. It is possible to meet the applicable performance standards of the Pennsylvania Residual Waste Management Regulations (25 Pa. Code Chapter 288), allow for regular monitoring of cap performance, and still support a broad range of Site development scenarios.

Response: EPA agrees. Detailed cap specifications will be finalized during the remedial design process.